



[From Crooke: A Description of the Body of Man, London, 1631.]

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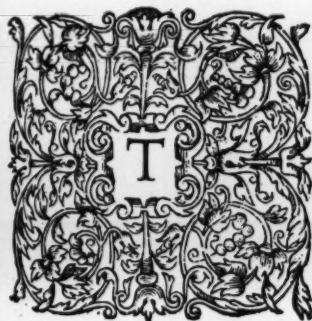
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CALEB HILLIER PARRY, M.D., F.R.S.

By SIR HUMPHRY ROLLESTON, BART., K.C.B., M.D.

CAMBRIDGE, ENGLAND



THE Parry family came from Pembrokeshire, the name Ap-Harry signifying son of Harry (compare Ap-Thomas, Ap-William), and formerly had considerable property in that county and in Carmarthenshire. But the stock was prolific and the division of the property on one occasion between twenty-one children left the individuals with but little material wealth. The family crest (see bookplate) has above it the name "Sitric" (the Silk-bearded Chieftain, *obit* 1042) and below it the brief but expressive motto "Try."

Born on October 21, 1755 in Cirencester in Gloucestershire, Caleb Hillier Parry was the eldest of three sons and seven daughters, and himself had four sons and five daughters. From his maternal grandfather he inherited his Christian names and estates in Gloucestershire.

His father Joshua Parry (1719-1776), a non-conformist minister, was, to quote

his grandson Charles Henry Parry's anonymous account of his father in the also anonymous "Lives of British Physicians,"¹ "distinguished alike for his knowledge and talents in an Augustan age of literature." In sober fact, however, he appears to have dissipated his undoubted literary ability in fugitive and anonymous contributions on political, metaphysical and satirical subjects. In 1872, nearly a century after his death, his life, written by this same grandson, Dr. Charles Henry Parry (1779-1860), was published under the editorship of the latter's brother-in-law, Sir John E. Eardley-Wilmot. This "Memoir of the Reverend Joshua Parry: with some original Essays and Correspondence"² contains in an appendix some of his lighter efforts, such as "A Satyre on King George II in a Letter to His Majesty" (1746) which with much wit protects the sovereign and his ministers against the free criticism they had to "suffer or enjoy, whichever be the right word," as Mr. Stanley Baldwin, the Prime Minister, expressed it at the Royal Academy Banquet on May 2, 1925. It also included an apparently unfinished "Essay on the True Art of Flying" with an offer to explain the secret without price or reward, but which

does not contain anything serious about aviation or give the proffered information, and "Erastes, an Ethic Poem in Defence of Love" (1749).

Young Parry first met his lifelong friend Edward Jenner as a fellow-schoolboy at Cirencester. From this school, however, he was moved in 1770 to the Dissenters' Academy at Warrington in Lancashire, the cradle of Unitarianism and distinguished during its twenty-nine years of existence for what was then called "Low Arianism." Here he came under the influence of the divinity tutor, John Aikin (1713-1780), whose daughter Anna Laetitia (1743-1825) was a poetess and miscellaneous writer, a contributor to the once famous *Monthly Review*, well known as Mrs. Barbauld,³ and a friend of Joanna Baillie the poetess and sister of Matthew Baillie, who wrote the first book in the English language devoted solely to morbid anatomy (1795). John Aikin, junior (1747-1822) was a physician of no great note, but was a friend of poets, and a poet, collaborating with his sister, Mrs. Barbauld, whose life, as well as his own, was written by his daughter Lucy.

In 1773 Parry became a medical student at Edinburgh, then under the medical tutelage of William Cullen, but after two years he migrated to London, living for most of the time in the house of a friend of the Aikins of Warrington, and father of the future Lord Chief Justice (1779-1854), Dr. Thomas Denman (1733-1815), physician-accoucheur to the Middlesex Hospital (1769-1783) and then on his way to the summit of this branch of practice. In 1777 Parry returned to Edinburgh and graduated M.D. in June of the following year with an inaugural dissertation "De Rabie Contagiosa," a subject which the year before had been similarly utilized by John Heysham in a thesis of sixty-five printed pages entitled "De Rabie Canina." Parry's dissertation of 102 pages, dedicated to Lord Bathurst, "the Maecenas of the age" and his father's friendly patron for thirty years, contains due references to Heysham's thesis.

It may be mentioned here that he subsequently returned to the subject in 1814 in his work "Cases/ of/ Tetanus and/ Rabies Contagiosa/ or Canine Hydrophobia/ with Remarks, Chiefly intended to ascertain the/ characteristic Symptoms of the latter Disease in/ Man and certain Brutes/ and to point out the most effectual/ Means of Prevention," printed by Richard Cruttwell, St. James's Street, Bath, and sold by Underwood, Fleet Street, London. This monograph (pp. vi + 218) was dedicated to his "dear and oldest friend," Edward Jenner, as a mark of their uninterrupted friendship for nearly half a century and of their common interest in animal pathology. Jenner, it may be noted, had in 1798 dedicated to Parry his classical "Inquiry into the Cause and Effects of the Variolae Vaccinae, a Disease discovered in some of the Western Counties of England, particularly Gloucestershire, and known by the name of the Cow-pox," and in 1822 published "A Letter to C. H. Parry on the Influence of Artificial Eruptions in certain Diseases incident to the Human Body."⁴

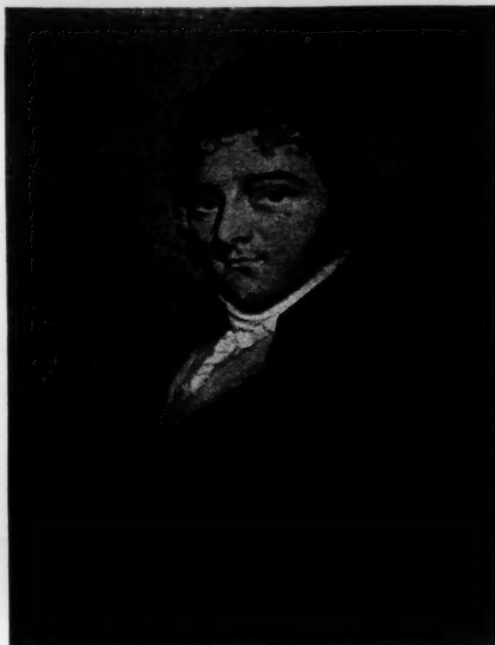
The object of Parry's brochure was to distinguish hydrophobia from diseases with which it was then confused, namely inflammation of the throat and of the stomach, convulsions, and especially tetanus. It therefore starts out with case records of four patients with wound tetanus (three fatal), and mentions another case of idiopathic tetanus, supplementing these with four cases (two idiopathic) in horses. Three cases of human hydrophobia seen in Bath (1807-1814) are then reported in full with their necropsies, and one of hysterical mimicry after a bite from a dog suspected to be mad, and excision of the wound. The subject is discussed at considerable length with numerous references to literature, a collection of thirty-nine recorded cases, and a modest reference to his own treatise of nearly forty years previous, "now deservedly forgotten," in which he suggested the name rabies contagiosa as preferable to others in preserving its generic term while

adding another indication of its mode of production. He remarks that "in reality so many of the maladies which have been mistaken for canine rabies have arisen from an extreme fear of the consequences of a bite, that this circumstance has given occasion to the scepticism of ignorant people as to the existence of such a disease." Further he points out that the *globus hystericus* is not, as authors commonly state, a mere sensation, but, often at least, as he had observed more than fifty times, an actual elevation of the larynx, and probably the pharynx, to such a degree as to induce a feeling of immediate suffocation, which he had nearly as often relieved by mechanically depressing the larynx. Some wise regulations for prevention are tentatively drafted, but with regard to curative treatment no successful remedy is forthcoming.

It is interesting to note that John Haygarth (1740-1827) who did so much to initiate the isolation of patients with fevers, though better known for his nodosity of the joints, was a practicing physician at Bath (1800-1827) after he left Chester, and also formulated "Plain Directions for Preventing the Hydrophobia from the Bites of Mad Animals"⁵ which Parry quotes with approval. Hydrophobia, of which I saw some cases at St. Bartholomew's Hospital in my student days and after, was practically banished from Great Britain by the muzzling order brought in by the late Lord (then Mr. Walter) Long of Wraxall in 1897, for in the five years, 1899-1904, there were two deaths only, both in 1902.

But to return to Parry's Edinburgh life. That he was an outstanding personality is shown by his election by his fellow students as president of the Medical Society of Edinburgh, for no one interested in medical history can have failed to have been struck with the frequency with which leaders of our profession have held this office; as a nursery of future leaders it is indeed much in the position of "the Unions" at Oxford and Cambridge in regard to the prime and

other ministers of state. Parry was instrumental in obtaining for it a royal charter, and this distinction of the Royal Medical Society of Edinburgh remains unique for a students' society. In his annual address on May 1, 1778, after the Society had been for a winter session in complete use of its new hall and just before it was incorporated by a royal charter, Parry after praising



CALEB HILLIER PARRY, M.D., F.R.S. (PHOTOGRAPH OF AN ENGRAVING BY PHILIP AUDINET FROM A MINIATURE SKETCH DONE BY JOHN HAY BELL IN 1804.)

famous men, William Cullen and other teachers, exhorted his audience to follow in their steps and become like them "the dictators of the medical world."

This address, rather rhetorical and abounding in high-flown generalities, as it now sounds to modern ears, was with two other somewhat similar addresses reprinted in 1819 when an appeal was made for funds to extend the Society's buildings. The first of these presidential addresses was by Dr. Andrew Duncan (1771) who was president of the Society in 1764 and on five subsequent occasions, president of the Royal College of Physicians of Edinburgh (1790 and 1824), of the Edin-

burgh Medico-Chirurgical Society on its foundation in 1821, and in addition professor of "the Institute of Medicine" or physiology (1790-1821), and "first Physician to the King in Scotland" after holding the same office to the Prince of Wales for thirty years. The other address was one by Dr. (afterwards Sir) Gilbert Blane, president (1775), when the foundation stone of the hall was laid by "the venerable" Dr. William Cullen. Blane's administrative ability really made effective James Lind's methods for the suppression of scurvy and the improvement generally of the health of the navy. Blane was a prominent figure in the medical world of London and did not escape the attentions of James Wardrop in the famous "Intercepted Letters" in the *Lancet*,⁶ in which he is credited with "a certain sanctified, devout, deathlike expression of countenance." This is to some extent borne out by his nickname "Chilblain," prompted by his extreme coldness of manner.⁷ But however this may be, he did great service to the navy as was gracefully expressed nearly twenty-five years after his death (1834) by Sir Alexander Armstrong,⁸ subsequently medical director general, in speaking of him as "the Father of Naval Medical Science." Duncan, Blane and Parry were thus worthy examples of the eminence awaiting the young presidents of the Royal Medical Society of Edinburgh.

In October, 1778 Parry married the beautiful daughter of John Rigby of Manchester, to whom he had become attached when at Warrington, and to whom Mrs. Barbauld dedicated a poem: "To Miss R . . . on her attendance upon her mother at Buxton," beginning "When blooming beauty in the noon of power" and ending with perhaps a rather premature prophecy:

Thy name shall flourish by the good approved,
Thy memory honoured, and thy dust beloved.

Her maternal grandfather, John Taylor (1694-1761), a distinguished Hebraist, and her brother, Edward Rigby (1747-1821), a physician of note and mayor of Norwich,

are both "separately mentioned" in the "Dictionary of National Biography."

After spending some time on the Continent, visiting Holland, Flanders and France, the newly married couple settled down in November, 1779 in Bath. Here he remained for the rest of his life, hardly going away, so his son states, even for a day; but this may have been compensated by his special fondness for books of travel, which may in its turn also have sewn the seeds of adventure in his son William Edward, the arctic explorer and rear-admiral. They first lived at 13 Catherine Place and later at 27 Circus. On land bought on Sion Hill he built a house, Summerfield Park, where he experimented in horticulture, and in 1787 on a hired farm in the neighborhood went in for sheep-breeding and the production of wool. In April 1817, after his hemiplegic attack in the previous October, he retired to Summerfield Park and there ended his days. For much of this information I am indebted to Dr. F. G. Thomson, president of the British Medical Association, at its meeting at Bath in July, 1925, when a memorial plaque was erected on Parry's house, 27 Circus. It would appear appropriate and, from their common friendship with Jenner, not improbable that Parry should have attended John Hunter when he stayed in Bath in September, 1785, and had some anginoid symptoms; but Sir D'Arcy Power, Sir Arthur Keith and Dr. G. C. Peachey, the great authorities on John Hunter, assure me that there is not any evidence to confirm this anticipation.

On September 30, 1788 Parry was admitted a licentiate, corresponding to the present membership, of the Royal College of Physicians of London, but he did not become a fellow; he was elected a fellow of the Royal Society (1800), a member of the Society of Natural History of Göttingen, and an honorary member of the Farming Society of Ireland (November 28, 1808) for his signal services to the wool industry.

In his early days in Bath, as is almost inevitable, practice came slowly, and becom-

ing somewhat impatient he sought the advice of his old friend Dr. Thomas Denman. The latter wrote sympathetically, and after admitting the difficulties in the perennial problem why monetary success comes to one man and not to another, added:

What is very hard, and I know two or three instances of it, is that a man shall be esteemed as a friend, acknowledged to be a man of parts, but none of his friends thinks of employing him in his profession. This I can hardly explain, unless by the old observation "he is too good a poet to be a physician" . . . But whatever happens, it is a point both of wisdom to the world and justice to oneself, not to be put out of humor.

Thomas Young (1773-1829), a somewhat junior contemporary of Parry and long after his death described by one of his successors at his own hospital, W. H. Dickinson,⁹ as "the most comprehensive genius and greatest man of science who ever held the office of physician to St. George's, or, indeed to any other hospital," was regarded by the students of the day as "a great philosopher, but a bad physician." Young indeed was never a fashionable success nor did he amass a fortune from fees; Parry on the contrary became busy comparatively soon, for after what has been called the bread stage, namely the first ten years of practice, his fees varied from £300 to £600 a month. Once during an epidemic when walking home after a long morning's work his companion remarked that his waistcoat pockets, of the large fashion of the day, seemed very full, probably of guineas. "Yes," Parry replied, "I believe there are ninety-nine, I may make it a round sum before I get home."¹⁰

In 1781 he published "Proposals for a History of the Fossils of Gloucestershire" of which he had a large collection, but increasing occupation in more human relics prevented further progress with this work. Very shortly after settling in Bath he became physician to the Puerperal Charity, and in 1789 to the Casualty Hospital,

which, founded in 1788, was merged with the Bath City Infirmary in 1826 to form the Royal United Hospital. To this his eldest son, C. H. Parry, its first physician, presented the Parry Library, rich in old medical books. He was elected a governor of this hospital in 1782, and was also physician to the Bath General Hospital, founded in 1742, now called the Royal Mineral Water Hospital. Here on June 4, 1914 the late Sir William Osler, much interested in Parry's share in the recognition of angina pectoris and of opinion that if any man's name is to be associated with exophthalmic goiter "undoubtedly it should be that of the distinguished old Bath physician" (hence "Parry's disease" in his "Principles and Practice of Medicine"), appropriately opened a modern pathological laboratory.

As a prominent physician at such a fashionable health resort as Bath, Parry came into professional relationship which ripened into friendship with many men of distinction, such as Sir William Herschel, the astronomer, and Admiral Lord Rodney who suffered much from gout and after whom Parry's third son, who died in infancy (1786), was called. In April, 1809 Parry wrote a letter to the *Athenaeum* advocating Lord Rodney's claims to the invention of the naval tactics of breaking the line, and it is interesting to note that his predecessor in the presidential chair at the Medical Society of Edinburgh, Sir Gilbert Blane, who served with Rodney as physician to the fleet (1779-1783), also wrote in the same strain.

On January 19, 1789 there was read before the Medical Society of London a paper "On the Effects of Compression of the Arteries in Various Disorders, and Particularly in Those of the Head; with Hints towards a New Mode of Treating Nervous Disorders" by Caleb Hillier Parry, M.D., C.M.S.; the last three letters after his name signifying not Church Missionary Society, as it might suggest in these, though not outwardly more religious, days, but Correspondent of the Medical Society, the Metropolitan Fellows

of the Society in a similar way appending F.M.S. after their names. Parry was then interested in a subject he subsequently pursued with considerable enthusiasm, namely the determination of blood in excess or defect to various parts of the body, especially the brain. By compressing the carotids by the hands he exerted an effect on fits (some obviously hysterical) by diminishing the determination of blood to the brain, and by applying a tourniquet to the limb arteries he produced results which have since been obtained by others in various diseases, such as Raynaud's syndrome.

His son, C. H. Parry, translated Gottfried Christian Reich's paper on "Fever and Its Treatment"¹² "published by order of the King of Prussia" and revealing the treatment, namely by mineral acids in rather large doses, especially muriatic acid, which he had kept secret in order to obtain a good price, eventually getting a pension of £100. To this Caleb Hillier Parry contributed an appendix of twenty-three pages containing some cases of fever treated according to this method but without any very striking results.

In 1799 Parry published "An Inquiry into the Symptoms and Causes of the Syncope Anginosa, commonly called Angina Pectoris; illustrated by Dissections,"¹³ which has an interesting bearing on the morbid anatomy of what he preferred to call syncope angens, "the word 'anginosa' not being strictly Latin." William Heberden the elder (1710-1801), whom Johnson called "Ultimus Romanorum," the last of our learned Physicians (on which J. F. Payne¹⁴ comments: "But he might almost as well have been called the first of the moderns"), gave the first description, if Seneca's record of his own sufferings be excluded, of angina pectoris in a paper entitled "Some Account of a Disorder of the Breast,"¹⁵ read before the Royal College of Physicians of London on July 21, 1768. In the text he says: "The seat of it, and sense of strangling and anxiety with which it is attended, may make it not

improperly called Angina pectoris." At this time he had seen twenty cases but without any necropsy, and he very tentatively suggested "a strong cramp, or an ulcer, or possibly both." His once familiar posthumous "Commentarii de Morborum Historia et Curatione"¹⁶ contain fuller details of "The Doctors' Disease."

On November 17, 1772 two further communications on this subject were made to a meeting of the Royal College of Physicians of London. The first¹⁷ was a letter to Heberden, who by this time had seen fifty cases, from a man signing himself "Unknown" who, having read in the *Critical Review* an abstract of Heberden's paper, described his own symptoms, an account of angina which the late Sir William Osler¹⁸ considered one of the very best in literature, and said that Heberden might examine his body in the event of his death. The "Dissection," as it was called, by John Hunter drew blank; but Jenner, who appears to have been present, wrote to Parry: "I can almost positively say the coronary arteries of the heart were not examined." The second communication from Dr. John Wall¹⁹ (1708-1776) of Worcester has perhaps hardly received due attention; for in his letter to Heberden describing the post-mortem appearances in a case of aortic stenosis with angina, the first inch of the aorta is stated to be partly ossified, and later the spasm of the pectoral muscle is ascribed to "an irritation on the nerves of the thorax and heart," adding: "Perhaps it may throw some light on this affair to consider that the nervi intercostales or sympathetici distribute many branches to the heart, arteria pulmonalis, and aorta." These remarks recall the late Sir James Mackenzie's view that the pain of angina is partly due to spasm of the intercostal muscles, and also contain a faint suggestion of the lamented Sir Clifford Allbutt's conception of the aortic origin of anginoid pain.

A year later, though included in the same volume, Haygarth, then of Chester but

afterwards of Bath, who like Parry wrote on hydrophobia, contributed a case of angina with suppurative mediastinitis.

Parry's essay was originally read in July, 1788 to a small medical society in Gloucestershire numbering among its members Edward Jenner, who by this time had come to the conclusion that disease of the coronary arteries was the cause of angina. The explanation of his silence on this subject is given in a letter to Parry in which, after mentioning two cases showing after death disease of the coronary arteries, he goes on:

At this very time²⁰ my valued friend, Mr. John Hunter, began to have the symptoms of angina pectoris too strongly marked upon him; and this circumstance prevented any publication of my ideas on the subject, as it must have brought on an unpleasant conference between Mr. Hunter and me. I mentioned both to Mr. Cline and Mr. Home my notions of the matter, at one of Mr. Hunter's Sunday night meetings; but they did not seem to think much of them. When, however, Mr. Hunter died (1793), Mr. Home very candidly wrote to me, immediately after the dissection, to tell me I was right.

It seems probable, however, that Hunter was well aware of the association of angina pectoris and disease of the coronary arteries, for in 1776 John Fothergill²¹ published a fatal case of angina on which John Hunter, who had his first attack of angina in the spring of 1773, did the post-mortem examination and found that "the two coronary arteries from their origin to many of their ramifications upon the heart were become one piece of bone." Parry sums up in favor of coronary disease, and after quoting the case of ossification of the coronary arteries described in a letter from Dr. S. Black²² of Newry read before the Medical Society of London on March 10, 1794, some years before Parry's work saw the light, points out that Jenner and he had independently arrived at their conclusion before that date. The posthumous collection of his "Unpublished Medical Writings"²³ contains notes on four cases of angina pectoris, one in a woman, apparently of syphilitic origin,

observed in 1806, and another in 1813 of "ossification" of both coronary arteries.

Parry's most interesting work is the description of eight cases of exophthalmic goiter in his posthumous "Unpublished Medical Writings"²⁴ under the heading "Enlargement of the Thyroid Gland in connection with Enlargement or Palpitation of the Heart." The first case was observed in August, 1786 and so preceded Flajani's publication in 1800 and by many years those of R. J. Graves of Dublin (1835) and of Karl A. von Basedow of Merseburg, whose account of the three most important symptoms gave origin to the phrase "the Merseburg triad" (1840). But in the text he says: "My attendance on the three last patients having occurred at the same time (1813), first suggested to me the notion of some connection between the malady of the heart and the bronchocele." So that his full recognition of the disease came some twenty-seven years after he observed a case. Two case reports (Nos. 3 and 8), one of a patient "long affected with an extremely large swelling of the thyroid gland, which began at a period, the relation of which to the commencement of the disorder of the heart, she was unable to recollect" and of the other who had "had an enlargement of the thyroid gland for more than twenty years which has very much increased of late," may have been what would now be called a toxic adenoma. After the fashion of the day he treated the patients by bleeding and purging, speaks of determination of blood, which he regarded as an important morbid phenomenon, to the head in connection with ordinary bronchocele, and can "scarcely avoid suspecting that the thyroid gland, of which no use whatever has hitherto been hinted at by physiologists, is intended in part to serve as a diverticulum in order to avert from the brain a part of the blood, which, urged with too great force by various causes, might disorder or destroy the functions of that important organ."

Parry was a most constant and copious note-taker, and many of his jottings even-

tually saw the light in the three volumes of "Collections from the Unpublished Medical Writings of the late Caleb Hillier Parry" 1825, the third volume of which is made up of introductory essays by Charles Henry Parry, M.D., F.R.S., explaining the bearing of his father's work. It is rather remarkable how little Parry wrote on chronic rheumatism with which Bath is, now at any rate, so closely associated. In the first volume twelve pages are occupied with cases of rheumatism, several being of rheumatic fever; the first case is perhaps worth quoting in full as a problem for diagnosis: whether an empyema with toxic arthritis or possibly Poncet's tuberculous pseudo-rheumatism.

Rheumatic Inflammation symptomatic of general increased Impulse. Mr. E. W., aged seventeen, had several attacks of pulmonic inflammation, ending in suppuration, accompanied with violent haemorrhage from the lungs. In the acme of more than one of these attacks, before the abscess burst, and while the heat was extremely great, and the pulse reached 136 in a minute, the most acute inflammation came on in almost all his joints. But no sooner had the vomica burst, than the pulse began to approach to its natural state, and the rheumatic swellings disappeared.

Another problem rather of a different nature is the exact meaning of the word italicized in the following extract from the case history of a chronic rheumatoid lady who "went to Buxton, drank the waters, bathed and pumped for two months."

His careful records of many years' observation in practice were intended for a comprehensive work "Elements/ of/ Pathology and Therapeutics/ being the Outlines of a Work/ intended to ascertain the Nature, Causes, and most efficacious Modes of/ Prevention and Cure, of the greater/ number of the Diseases incidental/ to the human Frame, illustrated by numerous Cases and Dissections." The first volume only, on "General Pathology" was completed by Parry and appeared in 1815. It was in octavo size, its 463 pages occupied by 1023 numbered paragraphs, many of them short and aphor-

istic in form, others longer and giving interesting clinical examples. Among the latter are the twelve pages on "Diseases by Conversion" in which "a disorder wholly or nearly leaves one part or texture and the patient is immediately seized with a malady in some other part or texture." It was republished with the unfinished second volume under the full original title by his son, C. H. Parry, in 1825.

His most original investigation based on animal experiments appeared in 1816, "An Experimental Inquiry/ into the/ Nature, Causes and Varieties/ of the Arterial Pulse/ and into/ certain other Properties/ of the/ Larger Arteries/ in Animals with Warm Blood illustrated by Engravings."²⁵ It was dedicated to Sir Joseph Banks (1743-1820) who had written on the exportation of wool (1782) and on the merino sheep (1809), and thus had this special interest in common with Parry. Banks was president of the Royal Society for the extraordinarily long period of forty-two years, from 1778 until his death. In the Royal Society and in most other scientific societies the term of presidency is now limited to five years or less, but a century or so ago tenure and age limits were not much in vogue, at any rate as regards the "seats of the mighty." Sir William Burnett was head of the medical department of the admiralty for thirty-four years (1831-1855), Sir James McGrigor director general of the medical department of the army for thirty-six years (1815-1851), Sir Henry Hallford (the "Eel-back Baronet" of the "Intercepted Letters" of the *Lancet*⁶ from his Court manners) president of the Royal College of Physicians of London for the record period of twenty-four years, and Dr. James Sims, president of the Medical Society of London for twenty-two years (1786-1809). The latter was also a record, but an unfortunate or fortunate one, as the case may be, for it led to discontent and the secession of some determined fellows who founded, on May 22, 1805, the Medical and Chirurgical Society which became the Royal Society of Medicine

in 1907, and now has 3,511 fellows as against the 624 of the Medical Society of London.

As the basis of his research Parry carried out about thirty vivisections, involving the exposure and ligature of arteries in sheep or rabbits, with the operative assistance of his colleagues, mainly George Norman, and investigated the condition of the arteries as regards the pulse wave, taking numerous measurements in four-hundredths of an inch. Although some of his views, such as the absence of muscular fibers in the middle coat, have not stood the test of time, his conclusion that the pulse wave is due to the impulse given to the blood by the systole of the left ventricle, and not to active contraction and relaxation of the arterial wall, is in agreement with modern views. The experiments were carried on from September, 1814 to December, 1815 and were critically and exhaustively discussed in relation to the existing views on the subject. This was the last really productive work that he was able to carry out, for on October 25, 1816 he was stricken with right hemiplegia and aphasia. He remained, however, active in mind and no doubt stimulated his son C. H. Parry to bring out in 1819 "Additional Experiments on the Arteries" in answer to adverse criticisms "which appear to have been advanced in haste, in ignorance or in error." During the remaining six years of his crippled life he occupied his time by taking entire control of his farm and garden, by reading, and, though his speech was almost unintelligible, by collecting anecdotes and miscellaneous information of interest so as, with his daughters' assistance, to make several volumes. One of his last efforts was an essay on the character of Hamlet which he dictated to his daughters.

Parry was a cultivated man with wide interests, an omnivorous reader, no mean metaphysician, and keenly interested in natural history and its practical application, as shown by seven papers to the *Farmers' Journal* in 1812 and eleven papers from 1786 onwards at the meetings of the Bath and West of England Society of Agriculture,

Arts, Manufactures and Commerce. Sir Benjamin Hobhouse, who married, as his second wife in 1793, Parry's sister Amelia, and by his first wife was the father of the famous Lord Brougham (1786-1869), was president of this Society from 1805 to 1817. Among the papers just mentioned there were several on wool and merino, and in 1800 he published a separate book "Facts and Observations Tending to Shew the Practicability and Advantage of Producing in the British Isles Clothing Wool Equal to That of Spain," and in 1807 followed this up by "An Essay on the Nature, Produce, Origin and Extension of the Merino Breed of Sheep," published in the *Transactions of the Board of Agriculture* and awarded by the Board a premium of fifty pounds. The origin of his activity in this subject appears to have been George III, who sent two merino rams of the purest breed to the Bath and West of England Society for Agriculture in order to ascertain if it were possible to produce the finest Spanish wool in this country. Parry indeed was instrumental in showing that rather better wool could be obtained in Great Britain. Remarkably handsome, combining much dignity of manner with a certain playfulness, Parry must have been a charming personality. His portrait for which I am indebted to Dr. F. G. Thomson, is from a rather rare engraving by Philip Audinet from a miniature sketch made by John Hay Bell in 1804.

Of Parry's four sons one died in infancy and another at the age of twenty-one years; it is not surprising in view of their heredity that the two surviving sons, Charles Henry and the youngest, Sir William Edward (1790-1855) the arctic explorer, were so distinguished in their walks of life that their deeds are recorded in the British Valhalla, "The Dictionary of National Biography." His fourth daughter married John Eardley Wilmot, a collateral of Sir Edward Wilmot (1693-1786) physician in ordinary to George II and George III and son-in-law of the illustrious Richard Mead.

She died at the birth of twins, her seventh and eighth children, another evidence of the prolific character of the Parry strain. Some of the best years of the eldest son Charles Henry Parry's life (1779-1860) were devoted to the elucidation and confirmation of his father's medical views, which he did by editing and publishing in several volumes his various writings. He must have been an unselfish and self-effacing character, for his anonymous account of his father in the "Lives of British Physicians" and his essays on his father's medical writings contain little reference to himself. He was in fact a successful physician at Bath, a physiological worker and above all a man of letters. He was the author of several books, such as "The Parliaments and Councils of England Chronologically Arranged from the Reign of William 1 to the Revolution of 1688," published in London in 1839, and like his grandfather had a poem, "Winchcombe," to his name. He also did much in editing other men's books.

Parry died at his house in Sion Place on March 9, 1822 and was buried in the Abbey Church, Bath, where a memorial was erected by the medical men of Bath with the following epitaph:

H.S.E.
Caleb Hillier Parry, M.D., R.S.S.
Vir probus
Cultor Dei pius
Medicus sagax
Artem quâ pollebat
In hac urbe, per annos fere XL
Ingenio, moribus
Multiplici litterarum cognitione
Exonravit:
Scientia, naturae indagatione perispicaci,
Feliciter promovit
Ne tanto nomine
Ulla pars observantiae
Desideraretur,
Amici, eâdem arte consociati
Hoc marmor
P.C.
Vixit annos LXVI. Obt. IX Mens. Mart.
A.S. 1822.

In addition, his widow, who survived him for ten years, placed a marble slab with an inscription in English and some verses by an unknown hand over his grave.

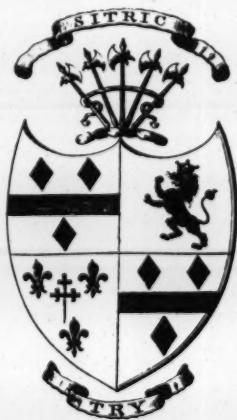
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here it obviously stands in serious earnest for the fellowship of a learned society. It cannot mean Associate of the Statistical Society which was not founded until 1837, but is probably, as Dr. Parkes Weber, F.S.A., suggested, the abbreviation for the latinized form of F.S.A., namely Antiquariorum Societatis Socius; for A.S.S., or more often S.S.A., was once used by fellows of this body, and in 1772 Thomas Percival became a fellow of the Society of Antiquaries, which was founded in 1572.

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Caleb Hillier Parry, M.D.

BOOKPLATE OF CALEB HILLIER PARRY, M.D., F.R.S.
(FROM THE COLLECTION OF H. M. BARLOW, ESQ.)

DIGBY'S RECEIPTS

By W. G. AITCHISON ROBERTSON, M.D., D.SC., F.R.C.P.E.

EDINBURGH, SCOTLAND

INTO the comparatively short lifetime of sixty-two years Sir Kenelm Digby managed to compress the energy and accomplishments which ordinarily are scattered through several lives. By turns he was diplomatist, courtier, theologian, cook, naval commander, leader of successful expeditions, original investigator, writer on theology, biology and medicine.

His father, Sir Everard, succeeded to large estates in 1592, became a Roman Catholic in 1599 and suffered death for complicity in the Gunpowder Plot. His eldest son, Sir Kenelm, was born in 1603 and at his father's death he came into a fortune of some £3000 per annum. He entered as a student at Oxford in 1618 but two years later he left without a degree. He then spent some years abroad, chiefly at Florence, and on his return to England from Madrid along with Prince Charles, he was knighted by James I in 1623.

In 1625 he had secretly married a lady who in childhood had been his playmate. She was the beautiful and morally frail Venetia, daughter of Sir Edward Stanley, and had previously been the mistress of the Earl of Dorset. Husband and wife were devoted to each other, and on her death he retired to Gresham College, where he remained in solitude for two years.

In 1627 he became a privateer and, commanding two ships, he engaged with and captured several Flemish and Spanish vessels. In the following year he had a brilliant victory in the Gulf of Scanderoon over the French and Venetian fleets. He wrote an account of his exploits in the Mediterranean, "Scanderoon Voyage," but as it is partly biographical and partly romantic, it is difficult to determine which is true and which false.

He had become a Protestant, but the allurements of his early religion were so

strong that he recanted and went back to the Church of Rome in 1636.

Sir Kenelm does not seem to have played a very straightforward course during the civil war, and indeed was for a time a prisoner. On his release he was expelled from Great Britain, and sought resting places in Paris and in Rome. During this period he published two philosophical works, "Of Bodies" and "Of the Immortality of Man's Soul."

In 1642 Sir Thomas Browne published his "Religio Medici," and his friend Sir Kenelm wrote a long and tedious criticism of it which was published the following year.

He was the foremost exponent in England of the wonderful powers of the "Sympathetic Powder" composed of many ingredients, including moss from a dead man's skull and mummy flesh. He explained and expounded its virtues at Montpellier before an assembly of French savants in 1658. He said that he had obtained the prescriptions from a Carmelite friar who had traveled in the East in 1622. He had made the first trial of it on a friend of his, James Howell, for a wound on the hand. The king, James I, and Dr. Mayerne, to whom he had shown the case, were much interested, and Francis Bacon had included the observation in his scientific collections.

In 1653 he was allowed to return to England and became the friend of Oliver Cromwell, and took a great part in the activities of all the literary and scientific world. He was one of the originators of the Royal Society and was one of the first members of its council in 1663. Two years later he died.

His was a curious and eventful life, well suited to the times in which he lived. He was a keen observer of nature as shown in his "Discourse Concerning the Vegetation

of Plants" (1660); and was well able to hold his own in discussions on theology, yet some of his contemporaries styled him "an arrant mountebank," and one called him "the very Pliny of our age for lying." Still he had many good friends, among them being Sir Thomas Browne, Descartes, Bacon and Ben Jonson. In the National Gallery may be seen the portrait of himself, his wife and two children by Vandyke.

It is, however, to one only of his works that I wish to show attention. It is entitled "Choice and Experimented Receipts in Physick and Chirurgery, collected by the Honourable and truly learned Sir Kenelm Digby, Kt., chancellour to her majesty the Queen Mother. Translated out of several languages by G. H. [George Hartman] London, printed for H. Brome at the Star in Little Britain, 1668."

The translator, dedicating the work to the Right Hon. George, Duke of Buckingham, says that he had "formerly the Happiness of bearing an humble Relation to Sir Kenelm Digby, and to his Business; by means of which Interest, and Favour, there came to my hand diverse of his Excellent Curiosities and Receipts: In truth, it is so choyce a Collection, that in the first place, I make it a matter of Conscience to recommend it to the Publique; And (having permission from his ingenious Son, Mr. John Digby thereunto) my next care was, so to do it, as to render all possible Honour and Right to the Memory of that Eminent Person."

The receipts deal with all manner of diseases and their cures. Most of them are examples of polypharmacy. At the end of some of these, it is stated "this will infallibly

cure"; but in many instances this is followed by another prescription also stated to cure and often by a third equally infallible.

Glancing through the volume, I made the following extracts to illustrate the style of pharmacy at this comparatively recent date:

To bring away the After-burthen or any Foulness or a Dead Child and to Cure the After-throws and Gripping, after a Woman is delivered. Take the inner skins (that are wrinkled) of Gizards of Hens that are laying of Eggs; wipe them clean and lay them to dry. When you have need to use them, heat them to subtle powder,



SIR KENELM DIGBY AND FAMILY. (MINIATURE PAINTED BY PETER OLIVER AFTER VANDYKE.)

of which give one dram for a dose in a little White Wine.

For Torn Bladders. Place a little bag containing some powder of Toads calcined so that the bag lay always upon the pit of the Stomach near the skin.

To Prevent a child ever taking Smallpox. Before tying the ligature tightly round the umbilical cord of a newly-born Child, drive up with the finger and thumb the blood that is at the Root of the Navel, that so you may drive away out of the child's body the loose Blood that is newly come in by the Spring. Then draw the thread close. This will cause, that this child will never at no age, have the Smallpox though he or she should converse daily with those that are infected. This has often been tried.

To prevent marking in the Smallpox. As soon as ever the pocks appear, oyle of Sweet

Almonds is to be painted all over the face. Then beaten gold leaf is to be carefully placed all over leaving no intervals and this will prevent any marking. *Another infallible Remedy for the same* was to dissolve in a wineglassful of sack as much fresh sheep's dung as possible and to cause the patient to drink it.

A sudden and infallible Cure of Bleeding, either at the Nose or by a Bloody-Flux. Take two parts of the Moss growing on the Skull of a Dead Man (pulled as small as you can with the fingers) and with Mastick and Gum-Dracagante make a soft Plaister and lay upon the Veines of the Forehead at the joyning of the Nose and along the eye-brows for Bleeding of the Nose. But for Bloody-Flux, it must be as large as the palm of the hand and round, to lay upon the Navil and all round about it.

To Cure the Tooth-Ach. With an iron nail raise and cut the gum from about the teeth, till it bleed and that some of the blood stick upon the nail. Then drive it into a wooden beam up to the head. After this you shall never have tooth-ach in all your life. But whether the man used any Spell or said any Words while he drove the Nail, I know not; only I saw done all that is said above; this is used by severall certain persons.

Another cure for tooth-ach was to fill the ear in the affected side with crushed parsley.

An Oyntment for Burning. Take cow dung and put to it sufficient quantity of Sein doux (Hog's grease); fry or boil them together. Strain the liquor through a napkin, and when it is cold, you will have a green oyntment which is excellent for burnings.

For the Falling of the Uvula. Gag yourself with the thumb, forcing your jaws as widely apart as possible all the time sucking in your breath. When you are weary, take out your thumb and rest. Repeat it till you are weary again. You shall not have done so thrice, but your uvula will be restored to its due place.

An Excellent Remedy to procure Conception consists of the syrups of Mother-wort and Mugwort, Spirit of Clary, root of *English* Snake-weed, Purslain, nettle and Rocket seed, Candite Nutmegs, Eringo roots, Satyrion roots preserved, Dates, Pistaches, Conserve of Succory, Cinnamon, Saffran, Conserve of Vervine, Pine-Apple-Kernels picked and pilled. Stamp all these into an Electuary. Put it in Gally Pots and keep it for use.

To Digest a Large Meal. When one hath eaten a great meal and that it lyeth heavy and dead on the stomach, and digesteth not but would hinder one from sleeping at night, drink a great draught of claret wine made as hot as you can well drink it.

To Stanch Bleeding. A very desperate and continual Bleeding at the Nose has often been stanch'd by making the Party hold in the hand or anywhere about their Body, a little of the Herb *Bursa pastoris*; wear it continually and it will prevent bleeding. It will suffice though one wear it but in their Pocket, or in their Hat-band.

For Wormes in the belly or Stomach. Take an Apple of *Coloquintida* and split it into two halves; fry one of them very well in good store of the Gall of an Oxe, till it be very tender and Pappy. Then apply it warm to the Navell of the child or man at the hour of their going to bed. Do thus three nights in all; This will kill any worms in the guts or maw, be they never so many or dangerous.

If any person hath worms in the belly, you may put up into the Fundament as far as you can, a long piece of fresh Bief in the form of a Suppositor, and let it remain there a good while. Worms will fasten to it, so that you will pull them out sticking to the Bief.

An Experimented Remedy for the Stone. A certain person in Rome was sick of a great Stone in his Bladder, Who after many Remedies (taken in vain) was resolved to be cut, but was cured by taking *Millepedes* dried and powdered along with Aqua Vitae. The third day after taking this, he avoided a great deal of Sand; but the seventh day he avoided so much that his Urine was full of it. And the ninth day the Patient was perfectly cured from his stone.

Another cure for this disease was to distil the dung of a Bull three years old and the water being taken will dissolve the Stone both in the Bladder and Kidnies.

To Cure the Hot and Cold Gowt. Take a good quantity of the Insect called Cockchaffert in the month of May and digest them in Spirits of Salt. The tincture is then to be mixed with Salt of Tartar and to begin with two to three drops in small beer is to be taken as a dose and increased by one drop until the fifth day, when a diaphoretick and purge are to be taken. An Experimental Remedy for the Falling-Sickness. Take *Cranii Humani*, and Pairings of Nails of

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Man, of each two ounces; reduce to a fine powder and grind it on a Marble Stone. Various vegetable ingredients are added and when boiled and mixed with sugar it is made into tablets. One is to be taken three times a day.

A Receipt of the Labour-Powder. Take date-stones, Amber, Saffron and Cummin-seeds and serce them all severally into very fine Powder. Take of each as much as will lie upon a groat; but double so much of the Cummin-seed, mingle them all together; and when the woman is in her greatest extremity, give her a spoonful of it in mace-ale. This is also very good to bring away the After-burthen.

To Dry up Sharp Humors with ones own Water. A certain Lady had an Humor broke out at the lower part of her heel which neither Physitians with Purgings and Diet drinks, nor Chyrurgeons with ointments could heal and dry up; it was healed in three or four Fomentations with her own Urine newly made and some White Salt dissolved in it. It is exceeding good to wash and bath ones feet and back-sinews with ones own Water, warmed. It strengthneth and suppleth them.

Powder of Sympathy. A Maid had been much troubled with a Tetter on her Arm above four years, much matter running out of it. Some of the matter being taken upon a Rag, was dressed with some Sympathetick Powder, and some of the Balsam applied to the Tetter, and so dressed twice a day for three dayes; and the Maids arm was perfectly cured, and continued well and firm.

To prevent Catching the Plegue. Take mineral Cinnabar and reduce it to the more subtile Powder. Mix it with turpentine and roll into flat thin cakes. Upon one side of them engrave the character of Mercury, which must be done *Die Mercurii* and *Hora Mercurii*, which is twice every Wednesday. Put this into a double piece of Sarsnet or into a Silver Box, and hang it about the neck of any person (or any living creature); it will infallibly preserve them from the Plague, though they converse with, or are about infected persons every day: the Pastels must be made very smooth, and the character well engraved. If on the other side of them you engrave the character of *Jupiter*, it will preserve from witch-craft, which must likewise be done *Die Jovis* and *Hora Jovis*. It will likewise preserve from Convulsion fits and Falling-sickness, being worn in a Sarsenet upon the region of the head.

Bezoardicum Theriacale. Take a Viper, which hath been newly caught; and hold her fast by the neck with your thumb and the next finger, so that she cannot stir or wag at all, and with a pen-knife cut her throat open, so that you may be able to tear out her tongue, which you lay by. Loosen also the skin round about the neck, joyning the head, and skin it all; afterwards cut the body an inch above the Navel, and throw away the tail. Then take out all the entrails, putting the grease by itself, and the heart and liver likewise; and cut the body or bulk upwards joyning the head, and cast away the rest. Prepare a great many Vipers after this fashion. Dry all these several parts apart in a slow oven. Then powder them dropping upon them now and then a drop of *Opobalsamum* or white oriental balsam, but gently so that it may be sucked by the Powder, that is, a pounding, without discerning of any liquor.

The Heads, Skins and Grease of the Vipers, which you have separated are kept, because they are endowed with sundry vertues. Dry gently the Heads and Skins and keep them by themselves. The Head being worn next to one's throat, is excellent against the Squinsie and other diseases of the Throat. The Skin laid upon the Kidneys of a Woman being in Travel, will promote her deliverance. And if the After-birth doth not come away after the child, put the skin upon the thigh of the Woman, and it will come away within a short time after. The fat is most excellent for the anointing of a red face. The skin being dried and cut small and mixed with oats, and given to a Horse that hath the Farcy, cureth the Horse, if it be continued for a while.

A Certain and often approved Remedy for the Dead palsie. Take white Onions, shred them small and bake them in an earthen pot until they become pappy. Make a thick Cataplasm of this and lay it upon the benumbed part. Change it every twenty-four hours, and continue it till you are well. If it be an Universal Paralysis, you must use your Cataplasm all over.

Numerous receipts are given for making Aurum potable and for the relief of surfeits. Overeating seems to have been a common complaint and contemporary history gives one an idea of the gluttonous habits of our ancestors.

THE BLACK DEATH AND THE MEDIEVAL UNIVERSITIES

By STEPHEN D'IRSAY, M.D.

BERKELEY, CALIFORNIA

DURING the thirteenth and fourteenth centuries medical learning in the great universities was of a very definite character. It represented the elaborate system commonly known as scholastic medicine. The universities of Latin Christendom were, in the middle of the fourteenth century, in possession of the Hippocratic Corpus, of Galen, Aretaeus, Paul of Aegina and other standard authors of antiquity. The classical works were accompanied by numberless commentaries and annotations at the hands of some of the Fathers, of the Arabs and of medieval Christian scholars, most particularly Gilles de Corbeil and John of St. Amand in the West and John the Aktuarios in Byzantium. These texts, systematized by the means of "Concordantiae" and "Conciliatores," formed the normative standards determining the attitude of scholars in all matters medical.

The systematizing of learning, attained through philosophical methods, had been constantly progressing, ever since university life began and reached its climax in the fourteenth century. It was at that time that the world was confronted with the catastrophe of the great epidemic of bubonic and pneumonic plague, and it is of no small interest to examine the attitude of official medical science in that great test. Happily, the most representative school of "medical scholasticism," the Faculty of Medicine of the University of Paris, furnishes us with some data of value.

The years 1348-1349 saw the appearance of the "*mortalega grande*," the great mortality in the West.¹ As is well known, the plague originated in one of its notorious foci, still in existence, either in Turkestan or in central Arabia. It was carried west by the Tartars and broke out in their ranks, when besieging the city of Caffa in the Crimea. The Genoese garrison of that city was attacked next and after the evacuation of the fortress the disease was conveyed

westward on Genoese ships, infecting the ports of call: Messina first, Genoa second, as is now established according to De' Mussi's account.² The epidemic devastated Italy and in the summer of 1348 it drew northward, through southern France, having changed its type from the pneumonic to the bubonic form. Great was the terror it inspired; such indeed that Pope Clement VI in Avignon requested autopsies with the motive to ascertain the causes of the disease,³ which seemed "to be hidden even to the most ingenious intellects."⁴

Paris was reached early in autumn. King Philip VI thereupon invited the Faculty of Medicine of the University to pronounce their opinion concerning the etiology of the epidemic and to give advice as to therapy. The King's curiosity was not less than the Pope's. The answer to the royal request is a long document,⁵ embodying the various views held at that time, displaying the attitude we were curious to know and throwing light upon the conclusions drawn from available evidence pertaining to etiology. That evidence spoke clearly enough for the contagiousness of the disease and was so recognized; everybody, including the famous Master Guy de Chauliac,⁶ believed in the necessity of isolation; everybody knew that infection spreads from the sick to the well. "Woe to us, for we cast at them the darts of death! Whilst we spoke to them, whilst they embraced us and kissed us, we scattered the poison from our lips. Going back to their homes, they in turn soon infected their whole families, who in three days succumbed"; thus De' Mussi. All the contemporary historians, the Villani brothers, Petrarch and many others record similar impressions. And says Guillaume de Machaut, the poet:

Po osoient à la' air aler,
Ne de près ensemble parler,
Car leurs corrompues alaines
Corrompoient les autres saines.⁷

That this indeed was the main source of infection, against which nothing but flight could protect, was freely acknowledged. Gentile da Foligno, a well-known medical figure of the period,⁸ advocates an *electuarium dyantibos* which, as he claims, preserves from the dangers looming in the air, but not "*a febre correptis preservat*."⁹ It was not possible to disregard the forceful appeal of actuality. Observations day after day, hour after hour, were not to be shunned, and advice given from all medical quarters was sound and to the point, confirming public opinion, the gist of it being: flee the sick and avoid contact with them. Empiricism thus intruded upon the prevailing rationalistic tendencies; the eyes of the profession were not quite dimmed.

But despite this partial sudden and disconnected shift from the rationalistic to the empirical plane of thought, the etiological ideas brought forth in the Paris document are entirely aprioristic and speculative. Small wonder: conspicuous events which thrust themselves upon the public mind had to be disentangled and brought to bear upon etiology. Earthquakes were reported.¹⁰ The whole civilized world was in a state of war: Waldemar the Dane waged war against the Russians, Louis the Great of Hungary conducted a campaign in Naples (incidentally, his troupes were instrumental in carrying the disease into Central Europe), the Hundred Years' War raging in France and Burgundy, with Crécy but two years behind; Emperor Cantacuzenos in mortal fight with the Serbs; Italy torn by feuds and bloody revolts; with the days of Rienzi in Rome. The terror-stricken population saw connections between all these awful events. The *Pestjungfrau* fluttered over Vienna in a garb of blue flame¹¹ and legends of terrible magic grew up everywhere on the Continent. In this maze of confusion the Masters of Paris preserve their cold detachment. While William of Nangis relates the pitiful death of scores of people daily in the Hôtel-Dieu,¹² with their nurses, lamenting the wickedness and lack of charity that ensued, the Faculty

proceeds to discuss the situation very systematically, on the basis of scientific theories.

The document is divided into two "Summae," on the causes and on treatment, which in turn are subdivided into chapters dealing with cosmic and telluric causes and signs on one hand and on dietary and "opotherapeutic" measures on the other. The etiology of the disease is given a very elaborate basis. Cosmic influences are traced to the various conjunctions of planets between 1345 and 1348. Aristotle is named as the authority for this hypothesis and is quoted as saying: "*Mortalitas gentium et regna vacua fiunt apud conjunctionem duarum stellarum, Saturni praecipue et Jovis, propter permutationem ipsorum, de triplicitate ad triplicitatem*."¹³ Mars was in the sign of the Lion: therefore the winter was warm, evil vapors were attracted from water and earth corrupting the air with which they mixed. Pliny and Albertus Magnus are further cited as authorities in support of these cosmic causes.

Amongst telluric causes chief significance is accorded the air. Although, as we have seen, air is corrupted by an admixture of dangerous vapors generated by Mars, the air in its own substance becomes corrupt also. (Note the metaphysical distinction.)¹⁴ Putrefactions in the earth, becoming widespread, produce earthquakes and these in turn hasten the rise of vapors from "swamps, pools, deep valleys, the bodies of the dead which—if neither buried nor incinerated—are very dangerous and may form the cause of the epidemic." Putting the blame on the air and winds for the transmission of pestilential vapors is a conception of antiquity, treated everywhere from Hippocrates¹⁵ to Lucretius¹⁶ and Virgil.¹⁷ It prevailed uninterruptedly and is broadly dealt with by Avicenna, upon whom the Parisians largely rely when they maintain that the noxa penetrates rapidly to and from the heart and lungs(!), sinking into all parts of the body¹⁸: "*Aer enim malus nocentior cibis et potibus, eo quod velociter penetrat ad cor et pulmonem cum sui*

malitia." And similarly they rely upon the Persian when they sum up their conceptions of pneumatic etiology: "Aer corrumpens principium vitae . . . est causa immediata epidemiae currentis."

On this ground speculation has ample scope and a broad foundation of Galenic pathology. The inadequacy of speculation becomes very palpable, however, when the topic turns to the symptoms and diagnosis of the disease. Observation, which rules here sovereign, is completely evaded. If we wish to learn something of the actual manifestations of the plague, if good descriptions are sought for, then we have to turn to keen observers, professional observers as it were, to poets, like Boccaccio¹⁹ or Guillaume de Machaut,²⁰ to historians like Simon de Couvain²¹ or Matteo Villani,²² to painters like Raphael,²³ Orcagna or Tintoretto,²⁴ all of them people untouched by speculation: this special virtue and qualification of orthodox "science."

It is strange that while many a clear record of symptoms is found in Hippocrates, while even Avicenna gives diagnostic and prognostic hints (*De signis eorum, quae in febris accedunt*)²⁵ derived from age, temperament, pulse, urine, vomitus, epistaxis, thirst, respiration, insomnia, headache, speaking of mental signs (*mentis emotio, iactatio*) as gauges of the severity of the disease: nothing of all this is mentioned in our "Consultatio." In place of the clear-cut symptomatology of a Chalin de Vinario,²⁶ the pithy and exact therapeutic advice of a Guy de Chauliac,²⁷ we are given a chapter on prognosis, and not the prognosis of the individual case, but the prognostic aspects of the epidemic as a whole.²⁸ General prognostic signs can be derived from manifold sources: cosmic and telluric; they are found in the color of heaven, in lightning and thunder, in earthquakes, in the appearance of dust-clad trees on the countryside, in the wholesale dying of fish on the seashore. For etiology and prognosis are interwoven: putrefaction is the cause of the epidemic, but the death of fish, for example,

is a sign of continued process of that sort, as is also the advent of prodigious numbers of frogs and reptiles,²⁹ *generatio spontanea*. (Very far indeed was Spallanzani!)

However, the medal has another face to which we should not be blind: and that is the recognition of something like preventive medicine. The preventive idea is a distinct achievement of the Middle Ages. Let it suffice to point to the famous anti-leprosy regulations of the Council of Lyons in 583,³⁰ regulations that blocked the migrations of the leprous, combining sound hygienic instinct with Christian charity, or to the sanitary ordinances of the city of Arles. The idea of prevention was constantly in the minds of trained medical scholars; one of the most popular textbooks used in the University of Paris, the "Pantegni" of Ali-ben-Abbas emphasizes it very clearly: "Nostra constructio et in sanitatis custodia et in morborum medela."³¹ Our document is written by men who were grounded in the "Pantegni" and their warning is: "Guard more than others" (*plis aliis sunt custodiendi*) the women and infants, the stout, the weak, the fearful, and so forth. And underlying this latter conclusion is another very healthy principle, that of "disposition": "Nulla causa est apta agere sine patientis aptitudine," no cause can act without the fitness of the patient, without decreased "resistance" in other words. Aristotelianism decidedly favors the "conditional mode of thinking," to use Verworn's favorite expression.³² Modern science might well be grateful to the Stagirite³³ whose constant influence enabled these masters to state a principle well-nigh obscured by the rapid advancement of etiological knowledge in the second half of the nineteenth century and which is now slowly reformulated in biochemical terms.

Turning to therapy, the monstrous prescriptions, so familiar from the diverse "Antidotaria," loom large.³⁴ I take a representative one, containing forty items. *Electuarium cordiale* is its name and the ingredients are wondrous indeed: cubeba,

cinnamon and pearls, emeralds, corals and antlers of deer, crabs and bile—it was composed *de omnibus rebus et quibusdam aliis*. There is some authority supporting the use of each, although they are not named in the document: Mesuë the Younger advocates bile, river crabs are referable to Abu-Djafar-Ahmed,³⁵ others to Avicenna,³⁶ to Galen. Emerald appears in all medieval lapidaries; it was the favorite stone of St. Hildegard of Bingen, the twelfth century visionary, and its value was restated by Gentile da Foligno: “si teneatur (smaragdus) in mensa, virtutem veneni debilitat, et si in ore, virtutem inficiendi diminuit.” Vinegar is a powerful prophylactic, and why do the Masters advocate it as such? We are indeed surprised to hear the reason: not because “sicut dixit Avicenna,” but: “Experimento enim habemus quod mirabiliter confert epidemiae; et plures quidem sanati a pestilentia magna propter consuetudinem bibendi ipsum cum vino subtili.” Experience tells us that it is of wonderful use! There is truly some truth in Sudhoff’s statement that at this time there is an increasing tendency toward empiric thought,³⁷ though not more than a grain of truth, to be sure, for have we not seen many an example of rationalism in this document with but a few scattered empiric statements? What we can rightly say, however, is that a dissociation occurs between the theoretical outlook upon disease and the practical attitude taken; while the first was completely speculative, the second was called into life by a dramatic demand for action which was incompatible with speculation.

If we try to discern in this remarkable memoir the three great forces operating in medieval and modern medicine: empiricism, science (scientific spirit and method) and Christian charity, the presence of the first two is apparent. We have clearly seen that results of observation crept in. As to science, the opening lines say enough: “Visis effectibus, quorum causa latet etiam ingeniosissimos intellectus, mens humana in admirationem deducitur³⁸ et cum ei

insit apprehensionis boni verique innata cupido (nam omnia bonum appetunt et scire desiderant, ut secundum philosophum apparet evidenter) denique post hujus admirationem, anima prudens, tam ordinato appetitui non resistens, sed de sui profec-tione sollicita, effectuum mirabilium causas reperire totis conatibus elaborat.” Strangely there is no trace of Christian altruism, a great stimulant of modern medicine. Let everybody shift for himself: this is essentially the advice given, ratifying the public attitude which was indeed horribly un-Christian under this dramatic test, according to all contemporary witnesses.³⁹

It is of some interest to contrast the Paris “Consultatio” with a treatise written in 1349 by a physician of Montpellier.⁴⁰ We generally think of Montpellier as a center of clear-cut thought, of untrammelled scientific observation, being so close to Spain, whence spread the great wave of Arab learning. *Ex Oriente lux!*

But it was unfortunately the influence of the late Arabs, like Avicenna, authoritative doctrinaires whose rationalized system was more inflexible than anything hitherto created either in the East or West. And indeed, here we have a document which might well dispel such an illusion, for it displays even more speculation than the memoir of the Masters of Paris, it recurs to Avicenna on more occasions, it contains far more pure Galenism and there is in it no vestige of observational activity. Two examples may suffice. The bubos and consecutive abscesses are the result of ill coction, in other words, the preponderance of one or more humors. This is, of course, unadulterated Galenism. The other example is very interesting. The spread of infection from person to person was very obvious and demanded explanation. The author’s explanation is remarkable. He assumes ophthalmogenous infection. Knowing Euclid’s experiments in regard to reflection of light and the use of mirrors and the celebrated Archimedic lenses with which the Roman vessels in the harbor of Syracuse were set

afire he advances the theory that infection is something like radiation; it is reflected from eye to eye and sets others ablaze with the disease. Our author thus reasons by analogy, satisfying his and his contemporaries' intellectual needs; but would he ever have thought of a negative experiment, like screening the eye to prevent infection, to establish the truth of his proposition? Such a physical check was not found necessary and this example serves well to illustrate the aprioristic and rationalistic tendencies and methods in medicine. The statement is corroborated by other rather fantastic analogies, e.g., that of the "basilisk," conveying harm through its eyes: the *jettatura*! The author haughtily says: there is nothing miraculous after all in the contagiousness of the pestilence—the eternal attitude of the scientist, looking down with contempt upon the fears and superstitions of the laity. The whole tenor of this "Tractatus," with its frequently recurring *sicut dixit Avicenna* is, let us repeat it, a true product of Montpellier, the alma mater of Armengaud Blaise, the famous Avicenna translator⁴¹ and devoted adherent to the principles of the "Canon."

These two documents thus well illustrate the trend of thought which prevailed at that period in all the universities of the world. That thought was entirely rationalistic. The necessity of physical verification of preconceived or logically deduced ideas never suggested itself. Official medical learning remained under the spell of this trend of thought until late in the Renaissance. The Black Death, however, brought home to great numbers of physicians that observation and empiric judgment is a legitimate method in dealing with medical problems. It is well known what a flood of medical literature, of *Pestschriften*⁴² of various sorts, issued forth from scattered practitioners. We also know how strongly the plague (which did not cease to be endemic on the Continent for a long period to come) contributed to the development of sanitation. That Marseilles, Ragusa and Venice estab-

lished the Quarantine-system in the fourteenth century was but one of these contributions. But the universities, with their aprioristic scientific preconceptions, were foreign to this movement, retaining that Galenism which characterizes the two memoirs.

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14. "Corruptus . . . in sui substantia, et non solum qualitatibus alteratis."
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Πρώτον ἐ ἀπό τοῦ κοινοτάτου νοσηματος ἄρξομαι, πνοετοῦ. τοῦτο γάρ τὸ νόσημα πᾶσιν ἐφιδρεῖται τοῖσιν ἀλλοῦσιν νοσῆματι, ἀμα γὰρ τῇ φλεγμονῇ εἶδος βουβῶν καὶ πυρετὸς ἔπεται. . . . And. . . . ἀμφοτέρων δὲ τούτων αἴτιος ὁ ἀήρ. And. . . . ὁκῆταν μὲν οὖν. δάηρ τοιούτοις χρω σθῇ μιάσμασιν, ἃ τῇ ἀνθρωπίνῃ ὕψει πολεμιά ἐστιν, φῆνθρωποι τότε νοσέουσιν. . . .
16. *De Rerum Natura*. VI, 1090-1137.
"Ea cum casu sunt forte coorta
Et perturbarunt caelum, fit morbidus aër.
1096."
Also "Proinde ubi se caelum quod nobis forte alienum
Commovet atque aër inimicus serpere coepit,
Fit quoque ut, in nostrum cum venit denique caelum,
Corrumpat reddatque sui simile atque alienum. 1119."
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24. E.g., his paintings in the Scuola di San Rocco, Venice.
25. Canon IV, I, cap. v, 20, 31, 36, etc.
26. MICHON, L. A. J. *Op. cit.*, p. 19. "Pestilentis morbi gravissimum symptoma, zonam vulgo nuncupant; a bubonibus, carbunculis, tanquam solidus quidam nervus in partem vicinam distentam ac veluti convulsione rigentem producit, puta brachium vel tibiam, nunc rubens, nunc fuscus, nunc obscurior, nunc virens, nunc iridis colore, duos vel quatuor digitos latus . . ."
27. "Il n'étoit, pour se préserver, rien de meilleur que de fuir le pays avant d'être infecté, de se purger avec des pilules d'aloës, de diminuer le sang par une saignée." Maistre Guy de Chauliac, *Op. cit.* Advocates also the incision of abscesses and bubos. Vid. *supra*, and *Summa* I, cap. III, p. 9.
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39. GASQUET, F. A. *Op. cit.*, p. 22. "Instead of turning them to God, the scourge turned them to despair and this not only in England, but in all parts of Europe. Writers of every nation describe the same dissoluteness of manners." "And in these daies was burying without sorrowe and wedding without frendschippe and fleying without refute of socoure; for many fled from place to place because of the pestilence; but yet they were effecte and mygbte not skape the detbe." Contemporary chronicler, quoted in GASQUET, F. A. *Op. cit.*, p. 180.
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THE BLACK DEATH*

ITS SOCIAL AND ECONOMIC RESULTS

By HERMAN B. ALLYN, M.D.

PHILADELPHIA, PA.

THE spectacle of a pestilence marching steadily on from East to West, claiming thousands of victims, unchecked by anything that man can do, inspires horror, and in proportion to the degree of ignorance and helplessness that prevails, an angry resentment, with the demand that something be done, even to the extent of human sacrifice. If in the story of the spread of the plague in the Middle Ages, with its processions, its futile worship of this god or its vain offerings at that shrine, its torture and wholesale slaughter of Jews, its burnings of suspected poisoners, we are appalled at the ignorant brutishness of mankind, let us remember that they were only just a little removed from paganism, and that even we have not yet, in our day, acquired in full measure the conviction that all men are brothers. Moreover, it is only within the memory of some of us that we have learned the causes and prevention of typhoid, of cholera, of typhus, of malarial fevers, of yellow fever and of plague.

Since more has been accomplished in the past fifty years by medical men in the discovery of the causes of disease and in their prevention than in all the previous centuries, it may be interesting historically to review the progress and consequences of the Black Death, which swept over Europe like a hurricane, causing many more deaths than the World War. We shall at least be the more thankful for living in the twentieth century.

Whether or not the plague that affected the Philistines after they had captured the Ark of the Covenant was bubonic plague affords a chance for an interesting discussion. You will recall that the men that did not die were smitten with the tumors.

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After they had suffered seven months of pestilence they were advised to send the ark back with a trespass offering of five golden tumors and five golden mice, "images of your tumors and images of your mice that mar the land." The emerods (tumors) were evidently swellings that might easily have been buboes. After the Philistines had sent the ark back the pestilence abated among them, but seems to have attacked the Israelites, ostensibly because some of them profaned the ark by looking into it. It is certainly suspicious of bubonic plague that those who were attacked died very quickly: if they survived long enough to develop tumors recovery was possible.

As we shall see later the pneumonic and septicemic forms are extremely fatal in from one to three days; if the victim lives four to seven days buboes develop. It is quite probable that bubonic plague existed sporadically for many centuries. We know that there are endemic centers today in Yunnan, southern China; in Kurdistan; in southwestern Arabia; in central Africa (Uganda) and doubtless also in India, in central Asia and in Siberia. It is characteristic of all great epidemic diseases that they come in waves and then recede; that when they attack a virgin population the mortality is very great (for example, measles in the Faroë Islands); the same extreme fatality is noted when the disease recurs after an absence long enough to enable a new generation of susceptibles to be born and grow up.

Whatever opinion may be held as to the antiquity of the disease, W. Bulloch and Capt. S. R. Douglas are probably right in saying:

The first historical notice of a disease like bubonic plague records its occurrence in Libya

in the third century before Christ, or earlier; but this notice is only contained in a fragment from the writings of a much later physician, Rufus of Ephesus [about 100 A.D.], who also speaks of its occurrence in his own time in Libya, Egypt and Syria. Whether it was clearly known to the classical Greek writers on medicine is doubtful, but Aretaeus speaks of pestilential buboes. The plague of Athens described by Thucydides was apparently not this disease; nor was the destructive pestilence in the reign of Marcus Aurelius alluded to by Galen. We meet with bubonic plague again, however, in the great plague of Justinian, which started from Egypt, 542 A.D., and spread over a large part of Europe; it was described in Gaul as *lues inguinaria*. Epidemics succeeded one another in this and the succeeding century. At the end of the seventh century bubonic plague prevailed in Italy and is unmistakably recorded by Bede in England. But after that time it is difficult to follow the track of plague. Many European pestilences are spoken of in mediaeval histories, which may or may not have been bubonic plague, though no sufficiently clear record remains.¹

Classical and medical literature is full of references to the plague. The word signifies a stroke or blow, an allusion both to the suddenness as well as to the severity of the attack, particularly when the disease assumes epidemic form. While gradually the word plague has come to be limited specifically to bubonic plague, due to the *bacillus pestis*, in earlier times it was applied loosely to a number of different diseases with the common characteristics of widespread distribution and great mortality. The best description of a plague in early times is that recorded by Thucydides, who writes of the plague in Athens in 430 B.C. Thucydides was himself attacked and he witnessed the sufferings of others. So vivid was the description given by this classic writer that it has influenced unduly the writings of many others, notably Boccaccio, who have not been content to describe objectively what they saw, but have been

inclined to cast it in the phrases of Thucydides. There is some excuse for this, inasmuch as the disastrous effects upon a community of any great pestilence are much the same: fear, paralyzing effort and abolishing reason, justice, mercy and morality; heaps of dead with too few living to bury them; the survivors thinking only of their own pleasure and profit: "Eat, drink and be merry, for tomorrow we die" being their motto. Thucydides says:

The season was admitted to have been remarkably free from ordinary sickness; and if anybody was already ill of any other disease, it was absorbed in this. Many who were in perfect health, all in a moment, and without any apparent reason, were seized with violent heats in the head and with redness and inflammation of the eyes. Internally the throat and the tongue were quickly suffused with blood, and the breath became unnatural and fetid. There followed sneezing and hoarseness; in a short time the disorder, accompanied by a violent cough, reached the chest; then fastening lower down, it would move the stomach and bring on all the vomits of bile to which physicians have ever given names; and they were very distressing. An ineffectual retching producing violent straining attacked most of the sufferers; some as soon as the previous symptoms had abated, others not until long afterwards. The body externally was not so very hot to the touch, nor yet pale; it was of a livid colour inclining to red, and breaking out in pustules and ulcers. But the internal fever was intense: The sufferers could not bear to have on them even the finest linen garment. They insisted on being naked, and there was nothing which they longed for more eagerly than to throw themselves into cold water. And many of those who had no one to look after them actually plunged into cisterns, for they were tormented by unceasing thirst, which was not in the least assuaged whether they drank little or much. They could not sleep: a restlessness which was intolerable never left them. While the disease was at its height the body, instead of wasting away, held out amid these sufferings in a marvellous manner, and either they died on the seventh or ninth day, not of weakness, for their strength was not exhausted, but of internal fever,

¹ Bullock, W., and Douglas, Capt. S. R. In Allbutt, Sir C. System of Medicine, Lond., 1912, ix, Part II, 358.

which was the end of most; or, if they survived, then the disease descended into the bowels and there produced violent ulceration; severe diarrhoea at the same time set in, and at a later stage caused exhaustion, which finally with few exceptions carried them off. For the disorder which had originally settled in the head passed gradually through the whole body, and, if a person got over the worst, would often seize the extremities and leave its mark, attacking the privy parts and the fingers and the toes; and some escaped with the loss of these, some with the loss of their eyes. Some again had no sooner recovered than they were seized with a forgetfulness of all things and knew neither themselves nor their friends.²

It seems to me noteworthy that Thucydides does not mention buboes in the plague at Athens. Yet buboes were well known at the time he wrote. In the second Book of the *Epidemics* it is said: "fever supervening on buboes is a bad sign, except they be ephemeral: but buboes supervening on fever still worse." As Thucydides was a close observer it is a fair inference that if buboes had been characteristic of the plague at Athens he would have mentioned them. Those who are interested in the nature of the pestilence at Athens will find it discussed by Raymond Crawford, M.A., M.D., F.R.C.P., in his book on "*Plague and Pestilence in Literature and Art*."² Dr. Crawford thinks it was typhus, an opinion held also by Murchison.

There were a number of outbreaks of genuine bubonic plague, however, before the one that occurred in the fourteenth century, known as the Black Death, which particularly concerns us. And there were many pestilences in Italy and Rome, which probably were not plague. They may have been typhus, malarial fever, typhoid, influenza or other diseases which occasionally assume epidemic form. Whenever they occurred there was the same panic, the same mob demand that something be done in the way of atoning sacrifice to placate

² Jowett's translation, quoted in Crawford, R. *Plague and Pestilence in Literature and Art*. Oxford, 1914.

angry or neglected gods. In the Middle Ages religious hatred added fury to ignorance. Crawford describes the persecution of the Jews in the following language:

Amid all the panic of the Black Death, persecution of the Jews broke out with even greater ferocity than during the Crusades in the twelfth century. Some victim was needed to appease the maddened populace: so the Jews were accused of poisoning the wells, and even of infecting the air. Circumstantial accounts were circulated throughout Europe of secret operations directed from Toledo. The concoction of poisons from spiders, owls, and other supposed venomous animals was described, and its mode of distribution made known. So well did their accusers deceive themselves that in many places the springs and wells were sealed, so that no one might use them, and the inhabitants of many cities had to rely on rain and river water. If confirmation of poison were ever needed, the rack could be trusted to procure it: or, failing that, men could be found vile enough to deposit poison in places in which circumstances demanded its presence. Those who escaped the fury of the mob fell into the clutches of an inexorable justice. In the case of the Jews the suspicion of poisoning was prompted by the fact that at this time the practice of medicine, at any rate in southern Europe, was chiefly in the hands of Jewish physicians. Hideous massacres of Jews had taken place in southern France and Spain in the previous epidemics of A.D. 1320 and 1333, as we know from the writings of Rabbi Joshua.

Many Christians also were accused of being poisoners. It became dangerous to touch a door or building with the fingers, lest a charge of poisoning be lodged against the suspected person, though no doubt he was as free from evil act as were the witches of Salem.

Hecker in his "*Epidemics of the Middle Ages*" gives the following account of what was reported of the plague in eastern countries before its arrival in Europe:

Cairo lost daily as many as ten to fifteen thousand, being as many as in modern times great plagues have carried off during their whole course. In China more than thirteen million are said to have died, and this is in

correspondence with certain exaggerated accounts from the rest of Asia. India was depopulated. Tartary, Mesopotamia, Syria, Armenia were covered with dead bodies; the Kurds fled in vain to the mountains. In Carmania and Caesarea none were left alive. On the roads, in the camps, in the caravansaries unburied bodies were alone to be seen. In Aleppo five hundred died daily. Twenty-two thousand people and most of the animals were carried off in Gaza in six weeks. Cyprus lost almost all of its inhabitants, and ships without crews were often seen in the Mediterranean as afterward in the North Sea, driving about and spreading the plague wherever they went ashore.

Whatever confusion may exist as to the particular disease or diseases called plague and pestilence before and for some centuries after the Christian Era, by the Middle Ages we have a very clear picture of bubonic plague. It spread along the lanes of commerce from China, India and Asia. Then as now the West highly prized the products of the East, especially spices, silks, gums. The merchandise was transported overland by caravan to Bagdad, or by ship through the Persian Gulf to the Tigris, thence up the Tigris to Bagdad; or to Ormuz on the Persian Gulf or to Aden at the entrance to the Red Sea, thence by boat and caravan to Koos on the Nile, or to Cairo, Pelusium or Alexandria. From Bagdad the route led over the plains of Mesopotamia to Lycia, the shortest route but the most dangerous on account of robbers. Another followed the Tigris up into Armenia, thence to Trebizond and other Black Sea ports, or taking the road from the Caspian upon the other side of the Caucasus which led to the Genoese and other Italian settlements in the Crimea. Some of you may need to be reminded that in the fourteenth century Italy controlled the commerce of the Mediterranean Sea, and that Genoa and Venice, through their great merchant princes, dominated all other cities in the control of the eastern trade. They brought untold wealth and prestige to their cities, and paid the price in introducing with their

ships most devastating pestilences, among them the Black Death.

Gasquet says that in the countries along one of the trade routes by which the caravans reached the Italian ports in the Crimea, it is certain that the plague was raging with great virulence in 1346, the year before its arrival in Europe.

Gabriella de' Mussi, a notary of Piacenza, is the chief contemporary Italian authority upon the plague. He himself saw its outbreak in upper Italy. De' Mussi declares that Italian merchants had occupied Tana (Azov) and that in it they were besieged by Tartars and Saracens in 1346. The Italians were driven out of Tana and took refuge in Caffa, a Genoese settlement in the Crimea. The Tartars followed and laid siege to Caffa. The death broke out in the Tartar host and thousands died daily. The Tartars threw the dead bodies of some of their own people over the walls with the hope of infecting the garrison. The garrison in turn cast the dead bodies into the sea, but nevertheless the city became infected and almost depopulated. Some of the survivors took ship and carried the disease with them to Genoa in 1347. Crawford says these ships seem to have infected Constantinople on the way. The Emperor Cantacuzenos, quoted by Crawford, notes the early low delirium, and distinguishes pneumonic, bubonic and carbuncular types of the disease. He mentions cervical and axillary but not inguinal buboes, and also the dark patches on the skin, that later came to be termed "tokens." Gasquet says that the special symptoms of the plague in 1348 and 1349 were four in number: First, gangrenous inflammation of the throat and lungs; second, violent pains in the region of the chest; third, the vomiting and spitting of blood, and fourth, the pestilential odor coming from the bodies and breath of the sick. The gangrenous inflammation of the throat might be explained by a tonsillar form of the disease, with secondary pyogenic infection such as causes the carbuncles which are sometimes present. The second

form, with severe pains in the chest, no doubt indicates a pleuropneumonic type. The vomiting and spitting of blood indicates a severe type, septicemic or pneumonic. A contemporary writer says: "From the carbuncles and glandular swellings many recovered: from the blood spitting, none." Matteo Villani, writing of the plague at Florence, says that the sick who began to vomit blood quickly died. Guy de Chauliac says the epidemic was of two kinds: The first was marked by a "constant fever and blood spitting, and from this the patient died in three days." The second form was the well-known and less fatal bubonic type.³ These quotations make it evident that the Black Death was bubonic plague; and that it showed itself at first in its pneumonic and septicemic forms. Those who survived long enough to have buboes sometimes recovered. Even in our own time when the plague broke out in Manchuria, it presented itself in the pneumonic form, with a mortality of 100 per cent.

The adjective "black" as applied to disease, as "black" measles and "black" smallpox, probably means something more than a very severe type of the disease. I recall that the late Dr. Curtin told me that "black" measles was measles with pneumonia. Our own more recent experience with influenza of the severe type in which there were deep cyanosis, hemorrhages and pneumonia is illustrative. I have no doubt that the Black Death got its name because so many of its early victims showed cyanosis, petechial or other skin hemorrhages, and pneumonia.

The symptoms of the pneumonic form are:

The attack begins usually with one violent rigor, or repeated shivers, but these may be wanting. There are no prodromal symptoms. Headache, giddiness, vomiting, variable in intensity, follow. There is no primary bubo. The facial expression is one of great anxiety and there is imperfect articulation as in the

³ Gasquet, F. A. *The Great Pestilence* (A.D. 1348-9) Now Commonly Known as the Black Death. Lond., 1893.

bubonic form. Pleuritic pain may be felt on the second, third, or fourth day; cough, with expectoration, and râles heard on auscultation may commence on the third, fourth, or fifth. The temperature is high, but does not differ especially from that in other forms of plague. The prominent symptoms are cough and blood-stained expectoration. Sometimes, but not always, marked haemoptysis and excessive dyspnoea with a tendency to cyanosis. The respiration rate, according to Müller, was as a rule over fifty, sometimes rising to seventy-five. The auscultatory signs are those of lobular pneumonia. The dulness on percussion is not marked. The sputa have no characteristic appearance, but are found to contain bacilli in enormous numbers. These are also detected in the blood. Swelling of the spleen is very marked. Death occurs from failure of the heart. In older accounts death is said to have occurred within two days. At Bombay about half the cases were fatal within five days, but some were prolonged to a week or more. The disease is almost invariably fatal. (Bulloch and Douglas.)

As stated, the "great mortality" as it was called, reached Genoa early in 1348, and soon afterward another ship or other ships carried it to Venice. At Genoa the plague spared hardly a seventh of the population. The mortality in Venice was about the same. Gasquet says that out of twenty-four excellent doctors twenty died.

On Sunday, March 30, 1348, the great council of Venice chose a commission of three to watch over the public safety. The rich fled from the place, officials could not be found, and the great council was so reduced that the legal number for transacting business could not be gotten together. Notaries died in great numbers and the prisons were thrown open. When the epidemic had ceased the senate had great difficulty in finding three doctors for the city. In this emergency, Marco Leon, a capable physician and a native of Venice, who was in practice at Perugia, agreed to return to Venice. (Gasquet.)

Marco Leon seems to have had the necessary moral courage to stick to his job, dangerous though it was. In this respect his conduct stands in sharp contrast with that of Galen, who left Rome for Campania

and later for Pergamus in the time of the pestilence brought from Syria by the army of Verus, A.D. 165, and with that of Galen's illustrious follower Sydenham, who abandoned London until the plague had subsided.

In 1423 a pest house or Lazaretto was established in the island of Santa Maria di Nazaret. Forty days was the quarantine period, apparently because Christ spent forty days in the wilderness.

One of the earlier accounts of the plague is contained in the introduction to the "Decameron" by Boccaccio. Boccaccio records that the plague visited Florence in the spring of 1348, spreading from the East where it had appeared several years before. He says that it did not appear in Florence, as in the East, where, if any bled at the nose it was a manifest sign of inevitable death, but that in men and women alike there appeared at the beginning of the malady certain swellings either on the groin or under the armpits, some as large as a common apple, others the size of an egg, which were vulgarly called plague-boils. From these two parts the buboes in a brief space appeared in every part of the body:

Wherefrom after a while the fashion of the contagion began to change into black or livid blotches which showed themselves in many first on the arms and about the thighs, and afterward spread to every other part of the person, in some large and sparse, and in others small and thick sown; and like as the plague-boils had been first (and yet were) a very certain token of coming death, even so were these to every one to whom they came. Not only did few recover thereof but well-nigh all died within the third day after the appearance of the aforesaid signs: this sooner and that later and for the most part without fever or other accident.

He then records seeing two hogs mangling and attempting to eat the rags of a poor man who died of the plague. In a little while after turning round and round as if they had taken poison they fell down and died upon the rags.

Thousands sickened daily, and being altogether unattended and unsuccored died well-nigh all without recourse, some in the open streets. The corpses were laid before the doors of the houses, where, especially in the morning, those who went about might see corpses without number. Between March and the following July what with the virulence of the pestilent sickness and the number of sick folk ill-tended or forsaken through the fearfulness of those who were whole, it is believed that upwards of an hundred thousand perished within the walls of the City of Florence.

The most important and particular account of the pestilence at Avignon is that of a certain canon of the Low Countries who wrote at the time from the city to a friend in Bruges. He was in the train of a cardinal on a visit to the Roman Curia when the plague broke out. He writes:

The disease is three fold in its infection. That is to say, firstly, men suffer in their lungs and breathing, and whoever have these corrupted or even slightly attacked, cannot by any means escape or live beyond two days. Examinations have been made by doctors in many cities of Italy and also in Avignon by order of the Pope in order to discover the origin of this disease. Many dead bodies have been thus opened and dissected and it is found that all who have died thus suddenly have had their lungs infected and have spat blood. [The first autopsies in plague that I know of.] There is another form of the sickness, however, at present running its course concurrently with the first; that is, certain aposthumes appear under both arms, and by these also people quickly die. A third form of the disease like the two former, running its course at this same time with them, is that from which people of both sexes suffer from aposthumes in the groin. This, likewise, is quickly fatal. The disease has already grown to such proportions that no doctor will visit a sick man, even if the invalid would gladly give him everything he possessed; neither does a father visit his son, nor a mother her daughter, nor a brother his brother, nor a son his father, nor a friend his friend, nor an acquaintance his acquaintance, nor in fact does anyone visit another unless he is prepared to die with him or quickly follow after him To put the

matter shortly, a half or more than a half of the people at Avignon are already dead. Within the walls of the City there are now more than seven thousand houses shut up. In these no one is living, and all who have inhabited them are departed.

The canon also says that at Marseilles all the gates of the city with the exception of two small ones were closed, for there four-fifths of the inhabitants were dead.

Guy de Chauliac, in writing of the epidemic at Avignon, says:

The mortality commenced in the month of January, 1348, and lasted for the space of seven months. It was of two kinds: the first type lasted two months with constant fever and blood spitting, and with this people died within two days. The second lasted the rest of the time. In this, together with constant fever, there were external carbuncles or buboes under the arms or in the groin, and the disease ran its course in five days.

He goes on to say that the mortality was so great that it left hardly a fourth of the population. Even the doctors did not care to visit the sick from fear of infection, and when they did visit them they attempted nothing to heal them, and thus almost all those who were taken ill died, excepting toward the end of the epidemic when some few recovered. And then he adds: "As for me, to avoid infamy, I did not dare to absent myself, but still I was in continual fear." As a matter of fact, toward the end of the sickness, de Chauliac did take the infection and was in great danger for six weeks, but in the end recovered.

In 1348 the plague attacked England. In that year Calais was in the possession of the English. The islands of Jersey and Guernsey, with which England was in constant communication, were decimated by the disease. Ships passing from Calais, in all probability, carried the plague to the seaports of England. Galfrid le Baker says that it first came to a seaport in Dorsetshire and then into the country, which it almost deprived of its inhabitants, and from thence it passed into Devon and

Somerset to Bristol. It will be noticed that the plague was carried to Europe in ships, first from seaports in the Black Sea to Messina, Genoa and Venice, thence to Marseilles, and again, after sweeping through France, to England by way of Calais. Ships are notoriously full of rats and are by no means exempt from fleas (*Pulex cheopis* and *Ceratophyllus fasciatus*) and other vermin. There are vivid descriptions of ships, the crews of which had all died of plague, drifting about in both the Mediterranean and the North Seas. When the ships struck land and were boarded by the inhabitants the plague broke out.

For the spread of the Black Death into and through England I have followed Gasquet, who, while not a physician but an abbot, has delved deeply into the original writings of the period, including the church records, the Patent Rolls on which are kept the grants and presentations to livings, and the *Inquisitiones post mortem* for the period of the plague.

It seems that the plague was brought from Calais to Melcombe Regis (Weymouth), a sea-coast town of Dorsetshire, either in the summer or autumn of 1348. Melcombe Regis was a town of considerable importance at this period, for during the siege of Calais by Edward III it furnished him with twenty ships and 264 mariners, while Bristol sent only twenty-two ships and 608 sailors, and even London sent only twenty-five ships and 662 men. The summer and autumn of 1348 were abnormally wet. It rained day or night with hardly an exception from June 24 to Christmas. I believe fleas thrive in dampness, so that the weather may have had something to do with the rapid spread of the plague. However that may be, the Black Death spread from Melcombe Regis, apparently first by waterways, to Bristol and rapidly throughout England. London is said by some to have been attacked as early as September 29, while others make the date as late as November 1. Fifty thousand are said by Stowe to

have been buried in one churchyard. The narrow and dirty streets, the low unventilated and undrained houses, the lack of personal cleanliness, no rooms above ground, no soap or linen, living half the year on salt meats, all favored the rapid spread of the plague. Even in 1361, twenty-two years later, it was the custom to kill cattle and hogs in the streets and cast the offal into the Thames, for in that year the king forbade it by letter. The exact loss of life caused by the Black Death in England cannot be determined. In fact there is no agreement as to the number of the population before the epidemic set in. Gasquet says it is placed at four or five millions by some, while Rogers thinks it could hardly be greater than 2,500,000, and probably was not more than 2,000,000. There is general agreement, however, that the Black Death carried off about half the population. Gasquet calculates that from the numbers of institutions some 5,000 beneficed clergy died of plague. He adds that this number in reality represents only a portion of the clerical body, and that in any estimate of the whole, allowance must be made for chaplains, chantry priests, religious and others. "On this basis, and assuming the deaths of beneficed clergy to have been 5,000, the total death-roll in the clerical order would be some 25,000."

The clergy seem to us to have been surprisingly numerous in England considering the population, and the same is true of its religious houses. Gasquet says that "in Nottinghamshire the proportion of deaths in the beneficed clergy is found, as in other cases, to be half of the total number. Out of 126 benefices in the county the incumbent died in 65 . . . In all, not including its 49 monasteries, the beneficed clergy of the county numbered some 700." If the non-beneficed clergy were five times as numerous as the beneficed, this would make the figures for Nottinghamshire above 3,500, not including the 49 monasteries. This was a heavy burden for the people and for the land to maintain.

ECONOMIC AND OTHER RESULTS OF THE BLACK DEATH

1. The Black Death caused perhaps a greater loss of life than any pestilence before or since of which we have knowledge. It not only killed from a third to a half of the population of England, but it was equally fatal throughout the whole of Europe and what we now call the Near East. It was not so fatal in Germany as elsewhere, nevertheless the average mortality for the whole of Europe was not less than one-third, and it was probably nearer one-half the population. Such tremendous loss of life was bound to have noteworthy results on industry, on prices, on customs and on morals. Success, as Osler once said, is sometimes a question of survivorship. The man who survived the Black Death found himself, as laborers did during and after the World War, in a much better economic position.

We shall confine our statements to England because the researches of Gasquet and Rogers have supplied so much valuable information about this country. Before the plague there was a good harvest in England. At the time of the plague "there was sold a quarter of wheat for 12d., a quarter of barley for 9d., a quarter of beans for 8d., a quarter of oats for 6d., a large ox for 40d., a good horse for six shillings, and even for 18d." There was such a scarcity of laborers that none could be had for agricultural purposes. Twysden, quoted by Gasquet, says: "In the following autumn no one could get a harvester for less than 8d. with food. For this reason many crops perished in the fields . . . In one case where the owner of the property had died on the 28th of July, 1349, it is said that 114 acres of pasture were let at 12d. per year, and 'not more this year because of the mortality and dearth of men.'" At Cliffe, apparently on property belonging to the deanery of Holderness, the rents of customary tenants and tenants at will are stated to have been usually worth ten pounds five shillings a year, but in this special year they had produced

only two shillings. Prof. Thorold Rogers declares that everything that the land owner had to buy rose from 50 to 200 per cent. Iron, salt and clothing doubled in value. Herring, which formed an important part of the food of that generation, became so dear it was out of reach of the multitudes.

2. Since the Norman Conquest French had been not only the language spoken by the nobility and the clergy, but it had been, up to the fourteenth century, the language taught in the schools. This was not entirely a matter of choice, because instruction was almost exclusively in the hands of the clergy. Time and separation from France inevitably led to great corruption in the French in common use. You will recall that Chaucer says of the Prioress that she spoke French:

After the scole of Stratford atte Bowe,
For Frenche of Paris was to hire unknowe.

The successful war of Edward III against the French, the celebrated victories of Crécy and Poitiers, the capture of Calais, were possible because the national spirit of the English was back of the war. The English army was not an army of serfs and vassals. It was recruited largely from the yeomanry and was paid by the king. It was the clothyard shafts of the yeomanry, the shafts made famous in the stories of Robin Hood, which mowed down the French knights and their horses. So far as I know this was the first national army ever raised in England. When, therefore, the Black Death swept away so many of the clergy and the teachers, the times were ripe for a change in education. If the English could defeat the French in war there was no reason why they should be dependent upon France for its language. Therefore when John Cornwall, described as a "maister of Gramer," who probably from his name was Cornish, began to teach English in the schools, his example was quickly followed, so that when Trevisa wrote in 1385, he could say that in all the grammar schools of England the children "leveth Frensch," and construeth in

Englisch." Thus the Black Death contributed not a little toward making the language of Chaucer and of Langland in *Piers Plowman* the language of the nation.

3. Farming at that time was under a manorial system, under the supervision of bailiffs, and the farmers practically, if not actually, serfs. They were not permitted to leave the land. The land was in common, the villeins supplying the tools and teams and perhaps the food when they worked the manor lands, as they did for the privilege of farming their strips. But, after the plague, laborers, as stated, were scarce. They would not farm the land unless paid wages. There were disputes as to what the wages should be. The king issued orders that laborers should work for the former wages; but the orders were not enforceable. If the church owners paid wages for their harvesting, it took sometimes more than they could obtain from the sale of the grain. If they did not pay wages, the grain was likely to rot uncut. In either case the churches were, in many instances, compelled to appeal to the king for remission of the sums due to him.

To be brief, a result of this struggle was gradually a change in land tenure, a leasing system giving place to the former bailiff system. Moreover, the commons were broken up into pieces by hedges to simplify farming. These hedges, I believe, are still to be seen.

In a more recent study of the Black Death on the estates of the See of Winchester, Miss A. Elizabeth Levett⁴ maintains that there were no sudden or violent economic changes wrought by the Black Death. Changes in the labor service on the Episcopal manors had begun in 1208, but they were not yet complete in 1455. "No single manor in the Account Rolls had entirely commuted its labor services." Wages did increase, however, especially those of artisans and particularly those of the plumber. Perhaps the See of Winchester was more conservatively managed than other estates. The bishop may have been able to exercise greater control

⁴ Levett, A. E. *Oxford Studies in Social and Legal History*. Oxford, 1916, Vol. v.

over his tenantry. It is reasonable to suppose, too, as Miss Levett indicates, that the plague was not as destructive in some parts of England as it was in others.

4. We have seen what a heavy toll was taken of the clergy, fully fifty per cent having died. One result was the difficulty of replacing them. The clergy behaved very much as the laborers did; they demanded higher salaries. Gasquet says that whereas before the pestilence, when there were plenty of priests, anyone could get a chaplain for five or even four marks, or for two marks and his board, after the plague there was hardly a soul who would accept a vicarage for twenty pounds. In the Winchester Diocese which he cites as an example, the average number of priests ordained in each of the three years preceding 1349 was 111, in the fifteen subsequent years up to 1365, the yearly average was barely twenty, and in the thirty-four years from 1367 to 1400, the annual average number of ordinations was only twenty-seven. The scarcity of men for the priesthood can be attributed in part to the great demand for the services of survivors to carry on the business of the nation.

5. The Universities of Oxford and Cambridge suffered the loss of thousands of students. "The celebrated FitzRalph, Archbishop of Armagh, who had been Chancellor of the University before the event, declares that in his time of office there were 30,000 students at Oxford⁵: "So yt in my tyme, in ye University of Oxenford were thirly thousand scolers at ones, and now beth unneth six thousand." In this statement he is borne out by Gascoigne, who, writing his "Theological Dictionary," in the reign of Henry VI, says: "Before the great plague in England there were few quarrels between the people and few law cases, and so there were also few lawyers in the kingdom of England and few in Oxford, when there were 30,000 scholars at Oxford, as I have seen on the rolls of

the ancient Chancellors, when I was Chancellor there."⁶

The editor says on the passage:

They, i.e., the students, came from all parts of Europe. The number seems incredible, but Oxfordshire was, to judge from its rating for exceptional taxation, after Norfolk, then at the best of its industries, the wealthiest county in England by a considerable proportion. . . . This concourse of students was diverted by the great plague. . . . I see no reason to doubt the statement about the exceeding populousness of Oxford in the first half of the 14th century. (Gasquet.)

The King was so disturbed by the great falling-off that he addressed a letter to the bishops on the subject, urging that the clerical order be increased in number, morals and knowledge.

6. It is the general testimony of most observers that the effect of the Black Death was, as we have found war to be, destructive of moral and religious restraints. Instead, as some might think, that imminence of death makes a man walk in the fear of God, in the presence of plague, he fears his own fears, but neither God, man nor devil; he becomes brutish and licentious. In England, and probably the same was true on the Continent, the young, inexperienced clergy who had to be appointed to replace those who had died from plague, naturally exercised very little restraining influence on the people.

As the combined result of the low state of intelligence and morals, of the inability of the clergy to inspire confidence in their spiritual leadership, of the prevailing conviction that supplication to God, or the intercession of some saint (Sebastian or Rocco were the most popular) would avert the plague, there developed societies based upon the idea that mortifying the flesh by the penance of public scourging would appease offended deity and avert the plague. Thus during the Middle Ages the "Flagellants" in great numbers marched through the

⁵ Harl. ms., 1900, vol. II. Trevisa's translation of FitzRalph's *Propositio Coram Papa*.

⁶ Gascoigne. *Loci ex Libro Veritatum*. Ed. J. E. Thorold Rogers, p. 202.

cities, singing dirges and beating themselves with cords. Sometimes they took possession of a city, to the great disturbance of peace, order and quiet. They became such a nuisance even to the regular clergy that finally they were forbidden by the pope.⁷

The helplessness of the medical profession in the presence of plague and the extent to which even the more intelligent of them were dominated by current superstitions of the time may be judged by the advice of Guy de Chauliac. According to Raymond Crawford, among other preservatives he reckoned venesection, purification of the air by means of fires, comforting the heart with treacle and apples and things of savory flavor, consoling the humors with Galen's Armenian bole, and the prevention of putrefaction by the use of bitter things. Should the disease defy all these precautions, he then commends, as curative measures, bleedings and evacuations, with electuaries and cordial syrups. Buboes should be ripened with poultices of figs and boiled onions, pounded and mixed with leaven and butter. Then they should be opened and treated like ulcers.⁸

Ambroise Paré at a later date was not above the unworthy suspicions of his time. He writes:

What shall I add? They must keep an eye on certain thieves, murderers, poisoners, worse than inhuman, who grease and smear the walls and doors of rich houses with matter from buboes and carbuncles and other excretions of the plague-stricken, so as to infect the houses and thus be enabled to break into them, pillage and strip them, and even strangle the poor sick in their beds: which was done at Lyons in the year 1565. God! What punishment such fellows deserve: but this I leave to the discretion of the magistrates, who have charge of such duties.

⁷ Crawford, R. *Op. cit.*, p. 104.

⁸ Crawford, R. *Op. cit.*, p. 121.

Paré recommends the wearing of an amulet of arsenic over the heart in order that "the heart might become accustomed to poison, and so be the less innured when other poisons sought it."⁹

Though good does not arise out of evil, the very magnitude of the evil does sometimes inspire men of common sense and human sympathy to the establishment of an institution of recognized helpfulness. To the plague in Florence, 1244 A.D., we owe the founding of the first ambulance society in Europe, the Campagnia della Misericordia. It is curious and amusing to read that the money for the purpose was acquired through the fines paid by wool-sorters for the use of foul and blasphemous language at their meeting-house. One of their number, Piero di Luca Borsi, induced them, when the fines had reached a large sum, to spend the money in the purchase of six litters, one for each ward of the city, and to select two of their members weekly for each litter to carry sick persons to the hospitals or dead bodies to their burial. I have heard that the society is still in existence.

Anyone who is interested in the effect of the plague upon art should consult Raymond Crawford's interesting book. It is surprising how many great artists have painted plague scenes, or have portrayed St. Sebastian or St. Rocco, the patron saints of plague.

As to the effect of the Black Death on architecture I am not competent to speak, but those who have studied the subject seem to agree that building was almost stopped for a while, and that where it was resumed after interruption there can be traced a replacing of the figured and ornate style by the perpendicular.

⁹ Paré, A. *Livre de la Peste*. Quoted by Crawford, R., *op. cit.*, p. 158.

THOMAS DENT MÜTTER

PROFESSOR OF SURGERY, JEFFERSON MEDICAL COLLEGE, 1841-1856

By JOHN H. GIBBON, M.D.

PHILADELPHIA, PA.

DURING the first half of the last century Philadelphia was the medical center of America, and deserved the distinction, for in no other city during this period was there such a combination of distinguished teachers, writers and investigators. Her medical schools during the latter half of this period had in their classes students not only from every state and territory in the Union but from many foreign countries. During most of this period there were more than 1000 medical students in Philadelphia. Her teachers were men of distinguished ability, refinement and culture, were well educated and produced many textbooks of merit, and were familiar with the literature of their own language and that of France and Germany. It is striking to see how many of them began their literary efforts with translations of French and German works. This occupation was one of the "pot-boilers" of the ambitious young man of those days, helping him over the first hard and uncertain years, and doing much to make him known at home and abroad. Notwithstanding the time and expense entailed, many of these men had been educated in the best foreign schools (that of Edinburgh being the most popular), or had supplemented their studies with post-graduate work in the great medical centers of Paris, Edinburgh, Berlin and Vienna.

The early fame of Jefferson College was not a little due to the men who occupied its chairs of surgery and anatomy: McClellan, Pancoast, Mütter and Gross, names familiar to all medical men, and no history of American medicine has ever been, or ever will be, written that does not give due space to their accomplishments. It is interesting to note that two of the four, Pancoast and Gross, were succeeded by sons and that McClel-

lan's grandson later occupied the chair of anatomy. Mütter died childless.

When it was suggested to me to write of the early surgeons of Jefferson, Pancoast and Gross came first to my mind, but on reflection I concluded to choose but one and determined finally on Mütter, because less has been written about him, possibly because he wrote comparatively little himself. It is probable, however, that except for ill health and an early death surgical annals would contain more contributions from his pen. This does not mean that he did not report his work and publish his opinions. His contributions will be referred to later. He is known to the medical world today largely through two foundations, which he established a few years before his death, the Mütter Museum and the Mütter Lectureship. Yet his life and activities hold many other interests for the student of medical history.

Thomas Dent Mütter was born in Virginia in 1811 of Scotch and German ancestors. His grandfather, Thomas Mütter, who came from Scotland, settled in North Carolina and married a Miss Moore, a member of an extensive and influential family in the South. Members of both the Mütter and Moore families rendered distinguished services to their country during the Revolution, especially in opposing the march of Lord Cornwallis' army through the Carolinas and Virginia. A great uncle, George Mütter, was a colonel of artillery and later became Chief-Justice of Kentucky. John Mütter, the father of Dr. Mütter, was sent by his father to Scotland to be educated and on his return he settled in Richmond, Virginia, as a factor and commission merchant. He married Lucinda Gillies, who died in 1813, two years after the birth of Thomas Dent Mütter. The

father four years later developed tuberculosis and taking his secretary and a physician sailed for Europe in 1818, made a winter passage of the Alps and arrived at Naples, where he died in 1819, leaving his son and only child an orphan at the age of eight years. Mr. Robert Carter, a relative of the boy's mother, became his guardian and took him to his seat, Sabine Hall, in Richmond County, Virginia. He was sent later to Hampden-Sydney College in Virginia



THOMAS DENT MÜTTER (1811-1859).

and afterwards to the University of Pennsylvania to study medicine. Here he graduated in 1831 at the age of twenty years. At the termination of his medical course he found himself in frail health and decided to go abroad, with the double object of improving his physical condition by a sea voyage and his mind by a course of study in Paris, where were to be found the most advanced and most distinguished men in the surgical world. Their influence was deep and indelible and showed itself in all the subsequent activities of the young American. No young man of intelligence and discretion, wishing to increase his knowledge

and improve his culture, could have failed to do so in Paris during the reign of Louis Philippe. To one in his early twenties, passing from this quiet Quaker town to that environment of science, art, literature, music and alluring vice, the change must have seemed like that to another world. The transient American has always misjudged the French capital and usually the French race, but what these patriotic people have done in the past ten years has given us a more correct idea of the French character. This fine exhibition of her faith, her strength and her sacrifice should not have been necessary to show the world her true character, for has she not for generations been a leader in the arts and sciences of peace as well as of war? At the time of which we are speaking, she was undergoing a new birth. The men who were bringing this about were in every line noted for their intellect and their learning. Paris was the medical Mecca and was full of students and graduates from all parts of the world.

There was hardly a man occupying a teaching position in medicine in Paris at this time whose name and work are not familiar to us today. Some of the surgeons were Nélaton, Marjolin, Roux, Chassagnac, Dupuytren, Lisfranc, Ricord, Malgaigne, Sappey, Velpeau, Larrey (*père and fils*) and Lembert. Teachers in other branches were Trousseau, Louis, Gay-Lussac, Lugol and Baudelocque. What an impression such a galaxy must have made on our embryo surgeon and what an inspiration they must have given him! The young man also spent some time in England and profited by his brief contact with her great surgeons. Later in life he made other trips abroad.

It is quite astonishing that this young man in less than ten years should have found himself full professor of surgery in Jefferson College and a colleague of Robley Dunglison, Joseph Pancoast, Charles D. Meigs, John K. Mitchell, Robert M. Huston and Franklin Bache. These seven men constituted the faculty for fifteen years and there has rarely been a more distinguished one in

America. I can remember as a boy my father telling me of being sent by his father, a graduate of the University of Pennsylvania, to Philadelphia in the early forties to study medicine at the University and how he fell under the spell of the men whose names I have just mentioned and so decided to enter Jefferson. He often spoke of the attractive Mütter and told me how he had been examined by the professor while they sat together in his carriage and rattled over the cobble-stoned streets. All the members of this faculty had their attractions for the student. Mütter was not the most distinguished, he was not the best surgeon, he was not the best or the most frequent contributor to surgical literature, but he was a most popular teacher, not only because of his personal attractions, features, voice and bearing, but because he was enthusiastic and always endeavored to make his lectures interesting and comprehensive. It has been said that he "played" for popularity, but few of his contemporaries were free from this fault. I am afraid it is a thing not altogether unknown or unpracticed today, but I suppose at no period in our medical history was rivalry so marked with jealousy and unfairness. Medical lore and literature contain ample evidence of the personal abuse and criticism which medical men showered upon one another and of the acrimony which characterized the discussion of important questions, especially that of treatment. The same conditions existed abroad and I think the old world has been slower to drop this type of acrimonious discussion and unwarranted jealousy than we have in America. Gross in his autobiography tells an amusing story which is apropos. A certain English scientist, after a visit to the great von Haller at Berne, met Voltaire in Paris, who spoke very highly of the character, abilities and accomplishments of the eminent Swiss. The Englishman replied: "You speak better of him than he does of you," whereupon, with a shrug of his shoulders, the great Frenchman retorted: "Perhaps we both are mistaken."

I am convinced that one of the things which made for the success of the young rival of the University and which did much to insure her future was the comparative good feeling which existed in the faculty of Jefferson between the years of 1841 and 1856. The feeling between the two schools also began to improve and with the added magnanimity of an Agnew and a Gross, in later years it was largely eliminated as far as the faculties were concerned, though the students in the two institutions, individually and collectively, have at times brought forward in an unparliamentary way the good and bad points of both. Any institution is sure to suffer from internecine spats in its governing body or faculty and, although I am putting forth no claim that Jefferson was freer of them than any other medical school (she certainly had had more than her share from her foundation in 1825 by that well-known fighter, George W. McClellan, up to the inauguration of the faculty of 1841), yet I have been interested in studying the lives of her surgeons to observe their cordial relations. We are told that Mütter, who was of course much younger than Joseph Pancoast, the professor of anatomy, and by no means so skillful an operator, would, whenever he had a serious or difficult operation to perform, call upon his colleague for help and support, which was always readily given. Pancoast speaking of Mütter said: "My well-known friendship for him, from our close, affectionate, I may also say, unclouded intimacy of twenty years duration, etc.," and again "It is the sweetness of his character which I love most to recall." Pancoast's eulogy of Mütter gives us not only a picture of the one but an idea of the flowery style of the other:

He felt it a glorious thing to be able to rescue a patient from present suffering or impending danger, when everything else had failed, by the achievement of a successful surgical operation. He loved, by close investigation and careful comparison with all his previous experience, to match himself with the most difficult cases. He carefully prepared himself, even in the

minutest points, for the difficulties he had to encounter, and then, with equal skill and firmness, with a sparkling eye and dilating faculties, advanced to the task, more like (than anything else with which I can compare him) to a warrior in the lists, with white plume dancing on his brow, with spur on heel, and poised lance, his courage aroused with the danger, and his pulse stirred with the energy of the strife.

The relations too between Mütter's successor, Samuel D. Gross, and Joseph Pancoast were always most cordial and friendly, each having a genuine appreciation of the other. Of Mütter's personality Gross says:

In his dress he was the pink of neatness; and there was that dash, enthusiasm, earnestness, and action about him which never fail to elicit attention and create popularity. He was of medium height, slender and graceful in form, with light eyes and a handsome forehead. His voice, remarkably clear and distinct, had unusual strength and compass. In 1851, during my temporary residence in New York, I made a three days' visit to Philadelphia, purposely to hear the more distinguished teachers lecture; and there was not one of them in the two great schools who impressed me more pleasantly as a good speaker than Mütter. He appeared to be thoroughly familiar with the subject of his discourse, and every member of the class was seemingly an attentive listener.

As has been said, Mütter's contributions to surgical literature compare unfavorably both in extent and character with those of his contemporaries. He published a monograph on the treatment of club-foot and brought out an American edition of Liston's "Surgery." He also reported many of his cases and published some of his lectures. The *American Journal of the Medical Sciences* between 1841 and 1856 contains a number of his contributions.

On his return from Paris young Mütter must have "cut quite a swathe," in Philadelphia as he drove about her streets in a low carriage behind a big gray horse, driven by a servant in livery. But we are told that notwithstanding these auspicious phylacterics his progress was not rapid. He probably was a little too full of his French

masters and talked about them a little too much. But he was serious, sincere and ambitious, and after a while, when he had been teaching surgery in the Philadelphia Institute, a summer school, as an assistant to Dr. Thomas Harris, he established a reputation as a lecturer of no mean ability and as a surgeon of judgment and skill. In our profession, the two incentives which have been most productive of great results have been ambition and poverty. Mütter had the first and if the sting of the other had been sharper he would probably have had to resort more strenuously to that "pot-boiler" already mentioned and would have left behind him a more indelible impression. His forte, as a surgeon, seems to have been in reparative surgery, largely learned in Paris. He was celebrated for his operations for club-foot and other congenital defects, such as hare-lip, and for his plastic work on the deforming contractures from burns and injuries. A perusal of "Liston and Mütter on Surgery" will give one a good idea of his style. It is quite interesting to read his details of operations, especially the long and tedious plastic ones done on the face without an anesthetic. Today these seem incredible. Quickness and dexterity were essential to the successful surgeon of that day and Mütter's ambidexterity must have proved of value to him. He laid great stress on the importance of the preparation of his cleft palate cases for their ordeal and also on the after-care of these cases. As there was no anesthetic, he had to have some cooperation on the part of the patient so one of the things he considered necessary was the accustoming of the parts to manipulation. This was done by touching the palate with instruments and fingers over a number of days before the operation. He insisted that the patient should not speak for some days after the operation and attributes the cutting of some of the stitches in one of his reported cases to the fact that the patient talked in his sleep.

Mütter was an advocate of trephining for hemorrhage in head injuries, where a diag-

nosis could be made, and gives an excellent description of rupture of the middle meningeal artery.

He operated successfully for epilepsy of three years' duration, due to a depressed fracture of the skull. The case was reported by "My intelligent young friend, Doctor Squibb," he of subsequent ether fame.

In noting the paucity of Mütter's publications one regrets that he wrote nothing of his year in Paris. An idea of that great city in the thirties, from a medical viewpoint, can be found in the accounts of William Gibson, professor of surgery at the University of Pennsylvania when Mütter occupied the chair at Jefferson, and of J. Mason Warren of Boston. Mütter, however, might have looked upon the French life and her savants in a way differing from that of either Gibson or Warren.

At the time of his retirement from the faculty (1856) Mütter had accumulated a remarkable collection of anatomical and pathological specimens and of illustrations of morbid processes. Evidently the time his colleagues spent in writing, Mütter spent in collecting, and he has left a monument, the Mütter Museum, which will perpetuate his memory. If the Jefferson College had been able to properly and safely house this collection, she would probably be its possessor today, but Mütter before leaving this country for Italy, the climate of which he hoped would benefit him, wrote the College of Physicians of Philadelphia:

In consequence of ill health, I find myself obliged to resign, for a time at least, the office and duties of a teacher of surgery. With the view of rendering some return to my profession for the benefits derived from its prosecution for so many years, and, above all, to serve at once the cause of science and of humanity, I have determined to found a pathological museum which shall be open to all physicians and to all students of medicine without fee or charge of any sort. I herewith offer the guardianship of this museum to the Philadelphia College of Physicians as the body best qualified by the character of its members and the nature of its pursuits for undertaking the trust.

He insisted that the collection should be housed in a fireproof building. This condition the College was not then prepared to meet, but with the completion in 1863 of its new building at 13th and Locust Streets, the Mütter Museum was properly installed. Dr. Mütter had in December, 1858, three months before his death, signed an agreement with the College to turn over his collection if the College could comply with the condition within five years.

An inventory of the collection sent from the Jefferson College to the new fireproof building of the College of Physicians in 1863 showed: 474 bones, 215 wet preparations, 200 casts, 20 wax preparations, 8 papier-maché models, 5 dried preparations and 4 oil and 376 water color paintings.

With this custodianship came a gift of \$30,000.00 for the care of the Museum, for the purchase of additions and for the establishment of a lectureship. The College has faithfully carried out this trust and the Mütter Museum and the Mütter Lecture are known throughout the medical world.

Dr. Mütter married Miss Mary Alsop of Middletown, Connecticut. They had no children. The cause of the ill health, which forced him to resign his professorship, is usually given as gout, but Pancoast tells us he had numerous pulmonary hemorrhages and that he passed the winter of 1856 at Nice, hoping that the warm climate would prove of benefit. On his return he went to Charleston, South Carolina, where he died March 19, 1859. He is buried in Middletown, Connecticut, where his devoted wife erected a church to his memory.

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MALPIGHI'S "CONCERNING THE STRUCTURE OF THE KIDNEYS"

A TRANSLATION AND INTRODUCTION

By J. M. HAYMAN, JR.

PHILADELPHIA, PA.

THE demonstration of the capillary anastomosis between arteries and veins, implicit in Harvey's writing, was Malpighi's outstanding contribution to medicine. His investigations of the embryology of the chick, remarkable for their accurate observation of detail and for their exquisite drawings, give him rank among the foremost embryologists. Yet Malpighi's name is perhaps more frequently recalled because of its eponymic association with the Malpighian bodies of the kidney than in connection with these other observations to which historians are inclined to ascribe the greater importance.



VESALIUS' DRAWING OF THE KIDNEY. A, ARTERY AND VEIN; B, C, CAVITIES; E, SIEVE-LIKE MEMBRANE; F, URETER.

What significance did Malpighi attach to these structures which bear his name? Did their discovery effect any conspicuous change in ideas of kidney structure or function?

Aristotle¹ had taught that the bladder was the chief site of urine formation, and that the kidneys were not essential to life, but when present existed "not of actual necessity, but as matters of greater finish and perfection." Vesalius'² description of the kidney was little better than Aristotle's;

he pictured a large central cavity within the kidney, divided into two compartments by a sieve-like membrane. On one side of this opened the renal artery and vein, and from the other the ureter carried the urine to the bladder. Although this "opinion of the ancients" was corrected by such men as Highmore,³ and Bellini,⁴ it remained for Malpighi to give the first description of renal architecture which can bear scrutiny in the light of our present knowledge.

Highmore described the kidney as consisting of an outer parenchymatous or liver-like part, and an inner fibrous component. Within the latter he pictured an extensive, net-like anastomosis of arteries and veins, the spaces thus formed communicating with the pelvis.

Bellini's paper preceded Malpighi's by only four years, yet the difference in the two is striking. Bellini was concerned chiefly with the structure and divisions of the pelvis; the tubules, which he recognized as forming the bulk of the kidney, are described as radial, running straight from papillae to cortex.

Malpighi's essay, published in "*De viscerum structura exercitatio anatomica*," Bonn, 1666, is much more systematic and accurate. He was intensely interested in the embryologic form of the kidney, and how this is modified in the adult organ. He recognized a distinction between the cortex and medulla, that in the cortex are the glomeruli or "glands" and the convoluted tubules, while the medulla consists of straight tubules which join before reaching the papillae. He knew that the glomeruli were intimately associated with the ends of the smaller arteries and veins. The relation of the glomeruli to the tubules Malpighi could never demonstrate to his satisfaction; he

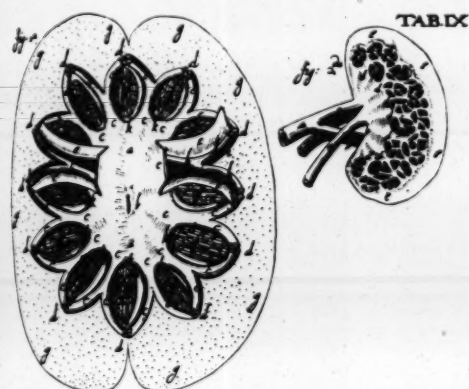
was driven to rely on "the deductions of reason." And until Bowman's paper before the Royal Society in 1842⁵ this relationship remained a matter of dispute. Ruysch⁶ believed the ends of the arteries communicated directly with the tubules. Schumlansky,⁷ on the basis of injection preparations, believed he had shown a connection between them. According to Bowman, Schumlansky's diagram "shows that he had a very clear conception of the fact." On the other hand, Huscke and Müller both denied that there was any connection between the Malpighian bodies and the uriniferous tubules.

It is impressive to compare the striking agreement of Malpighi's account of the

urinary vessels is divided, clear up to the outer surface, from where, reflected in different directions to the sides, they end in the deeper parts of the kidney. . . . The final little twigs of these vessels end at the glands described above.

Huber⁸ in 1906 wrote:

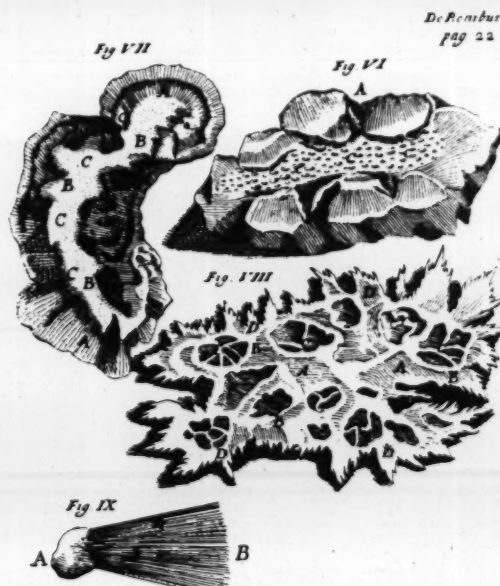
As is well known, the renal artery, on entering the hilus of the kidney, divides into branches which, after division, course in the peripheral part of the pyramid near the junction of the med-



HIGHMORE'S PLATE (1651) SHOWING OUTER LIVER-LIKE AND INNER FIBROUS DIVISIONS OF THE KIDNEY.

larger blood vessels of the kidney with a recent description. Malpighi in 1666 said:

Now the renal artery and vein enter the hollow of the kidney and are divided into many remarkable small branches. These follow the expansion of the ureter, which is called the pelvis, through a mass of fat. And where its appendages (called Tubules) extend from the pelvis about the papillae, they are prolonged toward the convexity of the kidney as if in the same little sac with the papillae, and then are curved to form a bow, and there meet other branches and anastomose with them. From this arch many branches are directed toward the convexity and outer part of the kidney, and others, themselves forming an interweaving reticulum, run between the lobules into which the mass of the

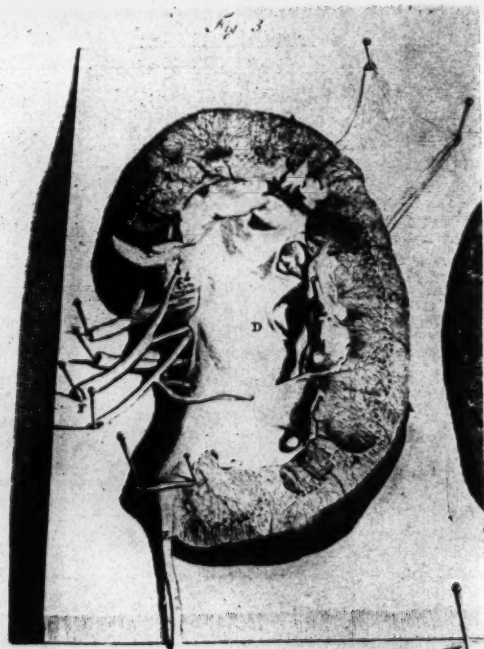


ONE OF BELLINI'S PLATES, SHOWING INTRICATE BRANCHINGS AND DIVISIONS OF THE PELVIS, AND IN FIG. IX THE TUBULES RUNNING STRAIGHT FROM PAPILLA (A) TO PERIPHERY (B).

ullary and cortical portions. . . . These major branches, which in their course undergo several subdivisions, have a direction which is in the main parallel to the surface of the kidney: they describe, therefore, arcs with convexity outward, and constitute the arterial branches designated as arcuate arteries (*arteriae arciformes*). From the convex side of these arcuate arteries, there arise at intervals of 2 to 5 mm. branches which very generally form an acute angle with the arcuate artery and pass with slight inclination toward the cortex. The length of these branches varies, and from their outer side, that toward the cortex, there arise short branches at relatively close intervals which pass toward the periphery of the kidney and very generally

subdivide into several branches from which arise the so-called interlobular arteries. The arcuate arteries ultimately terminate in smaller branches which also give origin to interlobular arteries.

Nevertheless there are still great gaps in Malpighi's description. He knew nothing of the medullary portion of the uriniferous tubule, described by Henle⁹ in 1862. It is hard to tell how clear was his conception of



PORTION OF A PLATE FROM BIDLOO'S ANATOMY, SHOWING MALPIGHI CONCEPTION OF THE RELATION OF "GLANDS" AND BLOOD VESSELS.

the Malpighian body. He compares them to other "glands" in the body, and although he traced the arterioles to them, he does not seem to have recognized the capillary tuft. So far as we know, this was first clearly stated by Ruysch.⁶ It is evident, however, **"Glandulae—quae revera nil sint, nisi Arteriolarum ultimae extremitates contortae; cum autem exactissime replentur Arteriae Renales, dissolvuntur vel expanduntur, quem ad modum fili glomer."*

Thesaurus Anat. Decimus, N. 85.

that Malpighi believed they were of the greatest importance in the formation of the urine. Indeed, the tubules seem to be considered simply as passage-ways to convey the urine "strained out from the arteries into the pelvis." And although at the present time we are by no means certain that the separation of the substances eliminated in the urine from those retained in the blood depends upon the size of the "particles" and of the "holes" in the glomeruli, the conception that the permeability of a membrane depends upon the size of its molecular interestices was put forward as late as 1867.¹⁰

Malpighi's essay has apparently never been translated into English. Indeed, the only translation seems to have been into French, by one M. Sauvalle in 1687. For this reason it seems worth while to give the whole text rather than further to discuss his ideas, leaving the reader to make his own comments.

The text followed is that of the Amsterdam edition of 1669 of "*De Viscerum Structura*," which differs from the text in the "*Opera Omnia*" (London, 1696) in only a few words. Both Vesalius and Bellini give drawings of the kidney; Malpighi gives none. This seems the more strange because of the beautiful cuts accompanying his embryological and botanical studies.

The plates of the kidney in Bidloo's Anatomy,¹¹ published in 1685, correspond very closely with Malpighi's description. Indeed, they almost force the suspicion that they were made from this rather than from dissections, for the erroneous conceptions of vessels "reflected" at the periphery of the kidney before reaching the Malpighian bodies seems too evident for independent observation. This plate is included in the belief that it gives at least a fair interpretation of Malpighi's conception of the relation between arteries and "glands."

CONCERNING THE KIDNEYS

INTRODUCTION

For a long time the kidneys have been the subject of varying opinions, some even having regarded them as superfluous and unnecessary, a thought which is certainly not a tribute to Nature. More recently, however, because of their wonderful structure, and because of the very necessary function attributed to them, they have attained a place among the important parts of the body. So many different views regarding their composition are held by anatomists that there is little agreement.

The ancients conceived of a sieve which provided a means for separating the urine. Many have been satisfied simply with the name "parenchyma." In the meantime, the idea of fibers for drawing out the fluid pleased some, and this idea was strengthened by the similar structure of the heart. Among subsequent writers the existence of fibers in the kidney appeared doubtful and unlikely, whereupon they announced that when the substance of the kidney was cut, certain little canals were to be seen. Later some have contended that the substance of the kidney is complex, parenchyma certainly, and fibers. And still more recently it has been stated in a very elaborate work that the substance of the kidney consists of a single fibrous substance, permeated by little canals. This was determined from cut sections in which, everything but vessels having been excluded, it was evident that the body of the kidney consists of nothing but a collection of little canals or channels which increase in size uninterruptedly from the external surface toward the center.

The fact that the human mind has pondered these and similar ideas about the kidneys through the ages stimulated me to further investigation, or at least to the confirmation of the statements of others. Study with me, then, a few things in the spirit of truth alone, so that we may establish the manner of Nature's operations in the individual viscera as I have revealed it in the liver and other organs. For this essay which I plan will perhaps shed light upon the structure of the kidney. Do not stop to question whether these ideas are new or old, but ask, more properly, whether they harmonize with Nature. And be assured of this one thing, that I never reached my idea of the structure of

DE RENIBUS

PROOEMIUM

Tam variam longa temporum successione passi sunt renes fortunam, ut etiam superflui, & frustranei non sine Naturae convitio reputati sint: mox tandem sola structura mirabiles, usuique valde necessario addicti inter conspicuas corporis partes sortiti sunt sedem. Horum compositio ita diversa apud Anatomicos exaratur, ut inter paucos conveniat:

imaginati namque cribri species antiquis inposuit, modumque separandae urinae secundum ipsos exhibuit. Solo parenchymatis nomine plures contenti acquievere. Fibrarum interim idea ad attrahendum serum pluribus arrisit, & haec consimili cordis structura firmabatur. Apud subsequentes dubia, vanaque exitit fibrarum in renibus existentia, unde canaliculos quosdam in eorum scissa substantia excitatos evulgarunt. Postremo multiplici substantia, parenchymatose scilicet, & fibris coagmentatos renes propugnarunt nonnulli: & novissime unica tantum constare natura, hacque fibrosa, meatibus pervia, percrebuit elegantissima elucubratione, ita ut ex inductis sectionibus secundum hanc sententiam concludatur, exclusa quacunque substantia, praeter vasa, renum corpus nihil aliud esse, quam canaliculorum, seu meatum congeriem, continuati ab extima superficie ad centrum usque propagantur.

Haec, & similia variis aetatibus circa renes mens humana meditans, animum meum ad ulteriorem indaginem, vel saltem adhuc usque doctorum confirmationem excitabat. Pauca igitur, ut conformis in singulis visceribus operandi naturae norma a me in hepate, & aliis detecta ulterius firmetur, in solius veritatis studium habeas, hoc etenim structurae etiam renum additamentum rebus, quae meditor, non infeliciter lucem forte accomodabit: nec haereas, an nova vel vetera sint, sed an naturae consonent prudentius quaeras, illud unum tibi spondens, me hanc renum structuram librorum ministerio nequaquam assequutum, sed patienti, longo, & vario usu microscopii; caetera vero inde deducta

the kidney by the aid of books, but by the long, patient, and varied use of the microscope. I have gotten the rest by the deductions of reason, slowly, and with an open mind, as is my custom.

CHAPTER I

THE DIVISIONS OF THE OUTER SURFACE OF THE KIDNEY

Since the position, shape and coverings of the kidneys are considered fully by the anatomists in their different works, I will mention only the peculiar way in which the kidneys develop, in order that their remarkable structure may be understood more concisely and clearly. I will begin with the outer surface, which in certain animals (as cattle, turtles and birds) is not everywhere smooth and continuous, but is cut into numerous remarkable, many-sided (roughly hexagonal) bodies by furrows and pits which make depressions in its surface. These bodies were considered glands or conglomerations by the ancients. In the bear, as is described by many writers, a mass presenting the appearance of a bunch of cherries is seen, and the surrounding space is filled with intimately adherent fat.

In man and other similar animals, the kidney is universally described as everywhere smooth; nevertheless, occasionally in the adult and often in the fetus its true formation is made clear; how it is pressed together from small portions which are separated by deep furrows. And in the adult indications of these divisions remain forever in the interior. By diligent research I have observed a rough and even a subdivided surface of the adult kidney. But to see this more plainly, the kidneys of new-born animals must be examined. In these many-sided lobules stand out, surrounded by little furrows, which seem generally to be obliterated with the increasing age of the animal. Vestiges of these furrows, however, persist, and may be distinguished by a different color if liquid is injected into the artery or vein. Under these conditions they appear red, and the stretched-out lobules, which retain the milder flesh color, are surrounded by them.

These subdivisions of the kidney are found not only on the surface, but they extend inward and produce some division of the flesh. In cattle and the higher domestic animals, and even in man himself, these remarkable little

ingenii, ut mei moris est, tarditate, animoque remisso parasse.

CAP. I

DE RENUM EXTIMAE SUPERFICIEI DIVISIONE

Ut brevior, clariorque rerum structura innotescat, cum fuse de eorum situ, figura, & involucri habeatur passim apud Anatomicos, peculiaritatum, quibus renes coalescunt, referam, exordio sumpto ab exteriori ipsorum superficie, quae in quibusdam, ut in bobus, testundinibus, & pennatis non undequaque levis est, & continuata, sed in plura insignia multiplicium laterum corpora ut plurimum exagona ex sulcis, & foveis renum periferiam excavantibus secatur, quae ab antiquioribus quasi glandulae, seu coagmentationes appellatae sunt: in urso enim ut a pluribus describuntur, appensa quas cerasorum congeries videtur, & suborta spatii adipe intime haerente replentur.

In homine, aliisque consimilibus levis undequaque ab omnibus licet describatur, ren, attamen aliquando in adultis; & saepe in foetibus manifesto ejusdem compositio elucescit, cum exiguis portionibus, altis rimulis sejunctis, conglobetur, & in adulto etiam perpetuo interius hujus divisionis permanent indicia; diligenti etiam indagine asperam, & ulterius semidivisam observavi hujus superficiem, quod tamen, ut clarius pateat, animalium nuperrime natorum renes sunt excutiendi; in his enim lobuli quidam multiplicium laterum emergunt rimulis circumscripti, quae acuta, & provecta animalis aetate, licet fere oblitterari videantur; earum tamen vestigia adhuc supersunt, varoque distinguuntur colore, nam rubedinem, vel saltem immissi liquoris per arterias, vel venas colorem referunt, & ita contenti lobuli, seu renum exiguae portiones, quae carnis colorem remissorem retinent, ab his circumambiuntur.

Hae renum subdivisiones non in sola superficie excitantur, sed intime etiam penetrantes carnis aliqualem distinctionem efficiunt; in bobus enim, & exaratis superius brutis, & in ipso etiam homine collectiones illae insignes conspicuis

bodies (surrounded in some animals by conspicuous furrows) have a definite shape and exact delineation in the interior of the kidney. They seem to form many-sided pyramids which are seen better in the turtle's kidney than in others, and less clearly in the human. Thus in these little aggregations one finds altogether the same subdivisions, which creep through the deeper substance of the kidney, described in man, the dog and the cat. The branches of the blood vessels which run through the outer portion of the kidney, and which arise from the renal vessels at their entrance, as is clearly seen in the cat, help and favor this division to some extent. These vessels follow along the cracks with remarkable little twigs, and more deeply embrace the subdivisions. The vessels supplying the deeper parts of the kidney, when they reach the outer surface, are reflected and bound these same spaces.

Therefore, we can rightly conclude that in certain beasts the kidneys are clearly formed as if from narrow, distinct fragments, and in adult man, granted that a single kidney is seen, nevertheless in the interior it is seen to be formed as if from small separate kidneys, though this is rather obscure. These component parts also cause further division on the surface.

The varied coaptation and binding together of the subdivisions form the external configuration of the kidney, which easily assumes its own peculiar form, so that similarity is attained whether these subdivisions were racemous or arranged in zones, as we read in the observations of anatomists from time to time about the gross appearance of the kidney.

Nor does this discontinuous structure of the kidney stop with the external surface, for when the capsule has been recently torn off, while the kidney substance is still soft, certain very small round bodies, like a coil of small worms, are observed, not unlike those which are found in the substance of the testis when the capsule is stripped off, or when it is cut open through the middle. If ink is poured over the surface and immediately wiped off gently, these coils are brought out beautifully by the microscope, and, in addition, the marvelous branches of the vessels with the "globules" attached to them (of which more below) are now and then seen lying beneath the outer surface, and occasionally in compressed spaces. These worm-like prolongations of the vessels are clearly seen in the

foveis in aliquibus brutis circumscriptae, tandem interius peculiarem figuram, & exactam distinctionem habent, videnturque referre plurimum laterum pyramidem, quod prae caeteris patet in testudinum renibus, & interius in ipso etiam homine: in his igitur collectionibus easdem omnino subdivisiones in homine, cane, & fele descriptas reperies, quae interius etiam per renum intimam substantiam repunt: hanc divisionem juvant & foveant sanguineorum vasorum partim per exteriorem ambitum perreptantium rami, ut evidenter in fele observantur ab ingressu emulgentium exorti, & insignibus propaginibus rimulas hasce excurrentes, intimeque subdivisiones hasce amplexantes, interna etiam propagata vasa, dum extimam superficiem attingunt reflexa eadem spatia finiunt:

quare non incongrue concludere possumus in quibusdam brutis renes exiguis quasi distinctis aliis minoribus evidenter conglobari, & in homine adulto, licet unicus videatur ren, subobscurae tamen interius distinctis quasi exiguis renibus constare, qui ulteriorem etiam exterius patiuntur divisionem.

Harum renalium portionem varia ad invicem adaptatione, & nexu, extima renum configuratio gignitur, quae de facili in monstruosam elaboratur formam, ita ut quandoque racemum, quandoque zonam, vel consimilia aemuletur, ut passim apud Anatomicos observatum legimus de monstruosis renum observationibus.

Nec subsistit hic renum in extima superficie discontinuata compages, nam de recenti ablata membrana, dum adhuc mollis est renum substantia, rotunda quaedam & brevissima corpora ad instar exiguum vermium circumvoluta observantur, parem dissimilia illis quae in testium substantia, ablatis involucris, vel ipsis per medium sectis, reperiuntur: hoc totum atramento exterius affuso, mox leviter deterso, exquisito microscopio detegitur, cujus etiam usu quandoque miri vasorum rami cum appensis globulis, de quibus inferius, sub extima superficie latitantes, & interdum interstitiis comprehensis conspiciuntur. In canum, & similibus renibus, ubi in concava parte sulcum promunt, ut subintrans vasis dent locum, hae vermiculares vasorum productiones evidenter obser-

curved part of the kidneys of dogs and similar animals where they form furrows and so accommodate the blood vessels which extend there. After short, sharp bendings and convolutions, close to the outer surface, these worm-like vessels run in a straight course toward the pelvis. I have sometimes seen this when the outer surface of the kidneys has been broken with the hands only. These worm-like bodies, however, are seen better in the convexity of the bird's kidney, where they are surrounded by blood vessels. From these considerations it is clear that the extreme ends of these worm-like vessels, which form the outer part of the kidney, are continuous with the descending vessels which go to the pelvis.

I confess that I have never been able to demonstrate this continuity, either on account of my clumsiness, perchance, or on account of the crudity of my instruments. Of course both reason and sense, aided by research, confirm the fact that certain continuous, tortuous spaces and little furrows (this established by very recent observation) run through the whole outer part of the kidney, and these are outlined when ink is injected through the renal vessels. For by the injection of ink, or by some similar means, many irregular meshes appear, since the liquid makes paths for itself through the blood vessels. Sometimes these meshes are seen to be hexagonal and to surround the smaller lobules of the kidney. And, as has often been described, the different branches of the blood vessels, bifurcating here and there, are also seen. A different color is produced by the injected fluid and the propelled blood. On this account those who are experienced maintain that in a section of the human cadaver the color of the kidneys will often vary. For a red color, very frequently clear and bright, has been noticed by them; sometimes it is dark and black, and not seldom grey; all of these variations are caused by different quantities of blood, or its absence.

CHAPTER II

THE OUTER PART OF THE KIDNEY SEEN IN A SECTION THROUGH ITS CONVEXITY

The observations which have been described so far are made clearer, and the intricate structure of the kidneys is further demonstrated if we examine the internal structure in detail, after making a cut through the bulge of the

vantur, quae post excitatas breves illas reflexiones, & circumvolutiones recto tramite per renis dorsum subsequendo extimam superficiem versus pelvim propagantur; hoc quandoque etiam videndum se mihi obtulit difracta solis manibus renum extrema superficie; evidenti tamen prae caeteris in gibbo renum avium deprehenduntur sanguineis vasculis circumscriptae: unde ex his demonstratur, connectionem vermicularium horum vasorum extimam renum superficiem componentem eandem esse cum descendentibus vasis usque ad pelvim.

Illud hic fateor, me ob visus forte hebetudinem, vel instrumentorum ruditatem, nunquam attingere potuisse, scilicet quod continuata quaedam, nuperrima observatione firmata per totam extimam renum superficiem excurrant tortuosa spatia, & sinuli, quos injectus ater humor per emulgentia vasa designet, & ratio, & sensus perspicillorum ope confirment; nam immisso atramento, vel consimili ex illata vi plures emergunt irregulares maculae ex affuso liquore vias sibi e vasis faciente, & quandoque exagonae maculae renum minores lobulos amplexantes deprehenduntur, & ut plurimum describuntur vasorum diversi rami hinc inde bifurcati, variusque color ex immisso liquore, & propulso etiam sanguine excitatur; quare in humanorum cadaverum sectione exercitati afferunt, renum colorem facile immutatum iri, etenim ruber frequentissime clarius, & splendescens ab ipsis est observatus, interdum obscurus, & niger, & non raro subalbidus, quorum omnium varietatem diversus sanquinis proventus, vel ejus carentia excitaverat.]

CAP. II

DE EXTERIORI RENUM SUBSTANTIA A SECTIONE PER GIBBUM OCCURRENTE

Huc usque exarata evidentiore redduntur, simulque renum artificiosa pandetur compages, si secto per dorsum rene interiora signatim rimabimur, hac etenim methodo in boum, canum, & similibus renibus, qui facile occurrunt, extima

kidney. now in such a preparation of the kidneys of cattle, dogs and similar animals, which are easily obtained, the outer part, which for half a finger's breadth is distinguished at the first glance by its peculiar color from the other parts of the kidney, must be considered.

This part, from the branches of the blood vessels bent into an arch up to the extreme periphery, is of a dark brown color; near the edge, however, the color is deeper, but with here and there small depressions of the lighter shade. In lower animals the part of the kidney lying below the arch of the vessels, toward the center, is reddish, and finally where it ends in the papillae seems partly white, partly red. In man a different color arrangement is seen, for in the outer part of the kidney the substance is reddish, and this color slowly fades toward the pelvis.

Passing over the course of the vessels, and of the other parts of the kidney which descend toward the pelvis, I will begin with a discourse about the above-mentioned part lying immediately under the covering membrane. Now various anatomists have differed in their opinions about the nature of this part. Many believe it sprung from coagulated blood or parenchyma; others think it is a peculiar fleshy substance, characterized by furrows. Still others, influenced by the different colors and complex structure of the kidney, think that it is of a double nature. This outer part they compare to the liver, with its peculiar parenchyma. The inner part, however, up to the pelvis, they think is fleshy, but fibrous.

We have considered these various weighty opinions of the authorities, and at the same time have demonstrated (definitely, in our opinion) that this outer part of the kidney is fibrous and similar to the other parts of the kidney. This is shown in those most careful drawings in which all the fibers, continuous and straight, are pictured extending from the papillary body to the outer surface. On the basis of this arrangement we have worked out the method of separation of the urine. We have reached our conclusions after long and varied efforts. However, all our researches do not altogether support the same conception in our mind.

It is certain that in this outer part of the kidney almost innumerable little canals (described elsewhere) are present, which are by no means fleshy, but membranous, and seem to be compar-

ipsorum substantia, quae semidigitalis fere est peculiari tantum colore a caeteris renalibus partibus primo intuitu discriminata, considerata sese offert:

haec enim portio a flexis in arcum vasorum ramis usque ad extimam peripheriam subfusi coloris est, prope finem tamen saturatior redditur, & varias hinc inde exiguas cicatriculas alterius coloris exhibet; subsequens vero substantia renum infra arcum versus centrum progressa in brutis subrubra est, & tandem, quae velut in papillam desinit, partim alba, partim subrubra in extremitate videtur; in homine etiam varius videtur color, nam in exteriori renum confinio subrubra est ejus substantia, & sensim versus pelvim diluitur ejus color.

Omisso progressu vasorum, & aliarum partium descendendum ad pelvim de priori tantum renum portione, quae immediate sub investientibus membranis latitat sermonem instituiam. De hac itaque varii exitere in ejus assignanda natura Anatomici, a concreto enim sanguine, vel parenchymate multi ortam credidere, alii peculiarem substantiam carneam tamen, rimulis distinctam putarunt, & aliqui colorum varietate moti, divisa renum substantia, in duplicem naturam, externam hanc hepatis similem, velut peculiare parenchyma, compararunt; inferiorem autem, & continuatam usque ad pelvim carneam, sed fibrosam censuere.

Diversas has Auctorum sententias expensas vidimus, simulque placito determinatum extimam hanc renum substantiam fibrosam tantum esse consimilem reliquis particulis renum ad pelvim usque, pro ut iconibus elegantissimis constat, in quibus a papilari corpore continuatae, & rectae omnes fibrae usque ad extimam superficiem protractae describuntur, ex qua positione urinae separationis norma nobis insinuatur. Quae tamen sensus nobis longa, & multiplici exercitatione obtulit, non eandem omnino mihi suadent sententiam:

nam certum auidem est in hac extima parte adesse canaliculos alias observatos pene innumeros, qui nequaquam carnei sunt, sed membranosi, & cum caeteris excretoriis vasis, ut

able to other excretory vessels, as the salivary ducts or biliary passages, not only in structure but in use. It is clear that this part of the kidney is formed chiefly by a mass of these little canals, which gives it the appearance of a kind of flesh, characterized by a peculiar softness and intimate coherence. But if a deep cleft is made in the outer surface of a macerated kidney by pulling it gently with the hands, almost all the part which looks like flesh, or a fibrous structure, or parenchyma, is seen to consist of membranous excretory vessels. This may be shown more easily by cutting a kidney through the back, taking special care that the section follow the direction of the fibers. Or perhaps one may do this—one may pour on ink and soon wipe it off gently with the finger tips; by this method one will have the true course of almost all of these vessels and their bendings. For a long time I have seriously doubted whether all these urinary vessels actually go straight on to the outer part of the kidney, and this doubt has been examined in the light of many experiments. Finally, I reached this conclusion, that not all the vessels of the urine are carried all the way to the surface, but they end here and there toward the sides, like the deep branches of the vessels which are formed into a sort of arch. Indeed, their most remarkable part, which reaches the outer membrane (as I have indicated above) is reflected inward, and there finds its ultimate end. On this account it is not strange that a section through the kidney presents an entirely new appearance, for although the vessels remain intact in the interior, toward the region of the convexity the laceration is always of such irregularity that those vessels which are reflected toward the sides are burst asunder.

It must be added, however, that there is considerable difficulty in believing that this whole part of the kidney is absolutely fibrous, and that nothing (except blood vessels) is present besides this fibrous material. For in all kidneys which up to this time I have been able to get, I have detected a number of very small glands. These I have observed in quadrupeds, turtles, and always in man himself. In order to see these glands, black fluid mixed with spirit of wine should be injected through the renal artery until the whole kidney swells, and the exterior grows black. If now the capsule of the kidney be removed, the glands immediately

salivalibus, poroque biliario, tum substantia, tum usu convenire videntur. Hi licet sua praecipue aggerie renum hanc substantiam componant, & propria mollitie, & intima adhaesione carnis determinatae speciem oculis exhibeant, constat tamen, si leviter in macerato rene manibus hinc inde deducto in extima superficie alte penetrans scissura excitetur, omnes fere portiones, quae nobis carnis, seu fibrosae, seu parenchymatosae speciem exhibent, excretoria, membranosaque esse vasa, quod etiam, ut facilius constet, secetur per dorsum ren, & maxime cures, ut secundum fibrarum rectitudinem sectio subsequatur, vel forte id contingat, affundas atramentum, mor sensim summis digitis detergas, ita enim horum omnium fere vasorum veros habebis progressus, & inclinationes. An vero recta procedant haec omnia urinae vasa usque ad extimam renum superficiem, hoc apud me valide diu dubium extitit, multisque aggressionibus examinatum: tandem certum istud collegi, non omnia urinae vasa ad superficiem usque ferri, sed superatis vasorum ramis in modum arcus extensis hinc inde ad latera finem sortiri, quin & eorum insignem portionem, quae extimam membranum attingit, ut superius innui, reflecti intro, ibique ultimum suae productionis finem attingere; quare non est mirum, si perpetuo, facta sectione, etiam ab interioribus partibus, scilicet a papillari corpore inchoata laceratione secundum horum vasorum rectitudinem, licet integra ulterius remaneant, prope confinium tamen gibbae, talis contingat irregularis laceratio, ut quid novum videatur id, quod emergit, reflexa enim haec ad latera vasa disrumpuntur, quae novam partium apparentiam exhibent.

Aliud etiam, quod additur, totam renum hanc portionem absolute fibrosam esse, nihilque praeter hanc, exceptis sanguineis vasis, adesse, multum difficultatis habet: nam in singulis renibus, quos huc usque ad manus habere potui, glandularum minimarum proventum deprehendi, hoc in quadrupedibus, in testudinibus, & in homine ipso semper mihi accidit observare. Ut autem hae facillime innotescant, injiciendus est niger liquor spiritu vini commixtus per arteriam emulgentem, ita ut totus turgeat ren, & extirius denigretur, nam nudis etiam oculis, ablata renum membrana, illico occurrunt bifurcatis hinc inde arteriis appensae nigro & ipsae

meet the naked eye, attached as they are to the arteries which bifurcate in different directions, the glands being dyed with the same color as the arteries. And when the kidney is sectioned in the same manner as before, longitudinally, between the bundles of the urinary vessels and the narrow spaces formed by them, one will see these same innumerable glands attached like apples to the blood vessels, the latter swollen with the black liquid and stretched out into the form of a beautiful tree. Common hearsay spreads a report in confirmation of this, saying that there seemed to be in the kidney a little stone consisting of as many particles as there were branches of the veins in the kidney. Of the particles of this stone the outermost, as it were the top, resembled a piece of small white marble, or, in shape and luster, a pearl of some size. And so this third part of the kidney, limited by the bounds explained above, consists of the glands, the branches of arteries and veins (to which you can perhaps add nerves) and finally the excretory vessels of the urine.

CHAPTER III

THE GLANDS IN THE INTERIOR OF THE KIDNEY AND THEIR CONNECTION WITH THE VESSELS

Since in the previous section we have mentioned the glands that have been discovered in the kidney, which, as will be shown below, contribute a special service in the excretion of the urine, it is now proper to pause briefly to consider their structure. These glands, situated in the outer part of the kidney, are almost innumerable, and probably, as I think, correspond in number to the urinary vessels by which the mass of the kidney is formed. The number of the urinary vessels in each fasciculus, by which the small lobules which have been described are formed, exceeds forty.

As to the structure of the glands, a distinct outline cannot be obtained on account of their minute size and translucency. They appear, however, spherical, precisely like fish eggs: and when a dark fluid is perfused through the arteries they grow dark, and one would say that all around them are the extreme ends of the blood vessels, which run along like creeping tendrils, so that they appear as it were crowned, with this reservation, however, that the part which is fastened to the branch of the artery grows black; the rest retains its former color.

colore infectae glandulae; & secto per longum eodem rene, inter vasorum urinae fasciculos, & ennata etiam interstitia innumeras fere easdem observabis, quae sanguineis vasis atro liquore turgidis in speciosae arboris formam productis, veluti poma appenduntur: vulgata circumfertur in hujus confirmationem historia, in qua visebatur in rene lapillos tot particulis constans, quot in rene venularum erant ramuli, quarum particularum lapilli extremum, velut caput marmoris rotundi, & candidi frustulum referebat, vel margaritae majusculae figuram, & splendorem; quare haec tertia renum pars superius expositis circumscripta terminis, glandulis, venarum, & arteriarum rivulis (quibus addere poteris fortasse nervos) & tandem excretoriis urinae ramilis, constant.

CAP. III

DE INTERNIS GLANDULIS RENALIBUS, EARUMQUE CONTINUATIONE CUM VASIS

Quoniam glandulas in renibus praevia sectione reperiri demonstravimus, & ut inferius patebit in urinae excretionem praecipuum conferunt munus, ideo circa harum conditiones leviter immorari expedit. Hae igitur in hac renum extrema parte locatae pene innumerae sunt, & ut probabiliter censeo correspondent urinae vasis, quibus coalescit renum moles, quae in singulis quibuscunque fasciculis, quorem ope in omnibus renibus expositae minimae illae divisiones suboriuntur, quadragesimum excedunt numerum.

Quod ad figuram, ob exiguitatem, & luciditatem, qua maxime pollent, distincta circumscriptio non habetur; videntur tamen rotundae veluti piscium ova, & dum per arterias ater humor propellitur, denigrantur, & circumcirca diceres habere vasorum extremas propagines, instar serpentium capreolorum incedentes, ut coronatae quasi appareant, cum hac tamen conditione, ut praecipue pars, quae arteriae ramo appenditur, denigrescat, residuum vero proprium retineat colorem:

The glands are connected with the branches of the arteries in the following manner. They spring from the deeper branches of the arteries and in some instances from the superficial branches which are bent inward and continued into intricate branchlets. That they are attached directly to these vessels is clearly demonstrated by the perfusion of colored fluid through the renal artery, for the glands and the connected arteries are stained with the same color, so that the eye very easily perceives their connection.

The glands are also connected with the veins, which follow the ramifications of the arteries; for when the veins are filled with ink, although the glands may not be filled with the same fluid, nevertheless the color seems to be worked in toward them, so that nothing intervenes between the glands and the ends of the veins. It is probable that the liquid injected through the veins by force, having overcome their valves, clings to the mouths of the glands and is shut out from their different passages.

To these arguments it may be added that the glands are at first white and almost translucent, then red, which certainly happens because of the blood of the arteries which is poured out. Moreover, it is known from the usual custom of Nature that the radicles of the veins take their origin from the same place in which the terminal arteries end, whence, although the senses do not perceive the connection, reason, nevertheless, sufficiently prevails.

About the nerves there will certainly be no difficulty, for it is commonly observed that these are carried throughout the interior of the kidney, whence it is probable that they are led to the glands along with the other vessels, as is seen in like conditions in other organs.

Another question can be asked, namely, whether a portion of the ureter reaches these glands which lie in the blood path; for the pelvis, as will be shown below, embraces in its own curve the veins and the arteries even to their capillary branchings. So we are permitted to think that it may be bound to the glands by its own fibrils.

There remains another vessel of excretion of the urine, of whose branches, as we have hinted above, the outer part of the kidney is chiefly composed. I worked a long time in order that I might subject to the eye this evident connection which reason sufficiently attests. For I

Connexionem talem habent cum arteriarum ramis, ut ab interioribus, & quandoque ab exterioribus partibus intro reflexis, & in multiplices surculos propagatis adnascantur, & ipsi appendantur: hoc evidenter demonstratur immisso colorato liquore per arteriam emulgentem, nam eodem inficiuntur colore glandulae, & continuatae arteriae, ita ut oculus facillime cohaerentiam ipsarum evidenter attingat.

Cum venis etiam, quae arteriarum expansionem subsequuntur, societatem habent glandulae: etenim dum injecto atro liquore inflantur venae, licet continuatae glandulae non eodem turgeant humore, eo tamen videtur insinuari color, ut inter glandulas, & extrema venarum infectarum nihil mediet, est enim probabile injectum per venas vi liquorem, superius ipsarum valvulis, ad ostia glandularum haerere, & dissimilibus ipsarum meatibus excludi.

His accedat, glandulas modo albas & fere diaphanas esse, modo rubras, quod certe ex arteriarum affuso sanguine contingit: constat autem ex consueto naturae usu ab eadem parte ortum trahere venarum radices, in quam descendunt extremae arteriae, unde, quanquam sensus hanc continuitatem non attingat, ratio tamen sufficienter evincit.

De nervis, nec forte etiam erit difficultas; haec etenim ferri per intima renum communiter observatur, unde ad glandulas cum caeteris vasis, ut in consimilibus conspicitur, deduci probabile est.

Aliud etiam quaeri potest, an ureteris portio in sanguineis glandulas attingat; nam pelvis, ut infra patebit, sinu suo fovet venas, & arterias usque ad capillares propagines; quare verum etiam possumus suis fibrulis glandulis neci.

Remanet aliud vas urinae excretorium, cuius ramis extimam praecipue renum molem conflant superius innuimus. Diu laboravi, ut oculis evidentem hanc continuationem subjicerem, quam ratio sufficienter attingebat, nam infusi liquores per arterias, etsi glandulas repleant, non tamen

have never been able to observe liquids perfused through the arteries penetrating the urinary vessels, even though they fill the glands, and the same is true when the veins are perfused. Liquid perfused by the same method through the ureter stains some divisions of the pelvis with its color, but is not able to blacken these excretory vessels of the urine which some call fibers, and thence the glands. So that in spite of many attempts (but in vain) I could not demonstrate the connection of the glands and the urinary vessels. Recently, however, a method occurred to me for attempting it in a living animal, which I have more often carried out in a dog. I tied the renal veins with a ligature and also, at the same time, the ureter; so that when the animal had lived a long time, I obtained a kidney greatly swollen from the blood which was driven in. When this was cut longitudinally through the back, it distinctly showed the branches of the urinary vessels, or fibers, together with the glands, between which, in some places, where the cortex of the kidney was more distended by the intercepted blood, and a fasciculus of the urinary vessels in turn more opened out, I seemed to see a certain connection and continuation, although not such as satisfied the senses in all particulars. Reason, however, can bring assistance. For if in the liver, in the brain, and in other glands, it is the invariable rule that each single acinus, or globule, of the gland throws out its own excretory duct besides the arteries and veins, the same will have to be said about glandular bodies of this sort. Since, moreover, these urinary vessels, or fibers, are elongated bodies, contiguous surely with the glands, and from their nature must be excretory vessels of the humors (for when compressed they pour out urine) it seems most probable that they have an intimate connection with the glands. If, indeed, as is probably agreed by all, the material of the urine is derived from the arteries, and since it is clear from the evidence above that the ends of the arteries lie open in these very numerous glands, and since the urine is eliminated into the pelvis through the fibers of the kidney as though through its own peculiar excretory vessels, there must of necessity be granted a continuity and communication between them, for otherwise no secreted fluid would be strained out from the arteries into the pelvis.

urinae vasa penetrantes unquam observare potui, quod etiam de venis mihi accidit, eadem instituta methodo per ureteres immissus liquor nonnullas tantum pelvis productiones suo colore infecit, nunquam tamen excretorium hoc urinae vas, quod alii fibras dixere, & inde glandulas denigrare valuit, quo propter multis (incassum tamen) tentatis machinamentis, glandularum, & urinae vasorum connexionem non intueri potui; postremo tamen hoc mihi tentandum occurrit in animali adhuc vivente, quod saepius in cane molitus sum: venas etenim emulgentes vinculo ligavi, & simul etiam ureterem, deinde, cum diu supervixisset animal, ex appulso sanguine ingenter turgentem abstuli renem, qui per longum in dorso sectus distinctas urinae vasorum, seu fibrarum propagines cum glandulis mihi exhibuit videndas, inter quas in aliquibus portionibus, ubi magis ab intercepto sanguine rarefacta erat extima renum pars, & successive vasorum urinae magis extendebatur fasciculus, aliqualem connexionem, & continuitatem mihi visus sum videre, non talem tamen, ut sensus omnino acquiescat: ratio tamen suppetias ferre potest, nam si in hepate, cerebro, aliisque glandulis hoc est perpetuum, ut singuli quique glandulorum acini, seu globuli proprium ramum excretorium, praeter arterias, & venas, promant, idem etiam erit dicendum de hujusmodi glandulosis corporibus: cum autem haec oblonga corpora sint, glandulis saltem contigua, & ex natura sua sint determinati humoris excretoria, compressa enim fundunt urinam, ideo probabilissimum videtur intimam cum glandulis hisce connexionem habere. His accedat, si verum (ut probabiliter in confesso apud omnes est) urinae materiam ab arteriis derivari, cum constet ex superius allatis extrema arteriarum in has copiosissimas glandulas hiare, & urinam per renum fibras, velut per propria excretoria vasa, eliminari in pelvim, necessario fatendum erit inter haec contiguitatem, & communionem intercedere, alias ab arteriis in pelvim nullus excerneretur secretus humor.

CHAPTER IV

THE REMAINING PART OF THE KIDNEY UP TO THE PELVIS

We have described above the outer part of the kidney, filled with glands, the branches of the blood vessels, and the complex clusters of the urinary vessels. And since we observe the continuity of the blood vessels and of the urinary vessels toward the center of the kidney or pelvis in the more perfect animals (in birds even to the bifurcation and dilatation of the ureter) it is necessary to go through with the description of this part.

The vessels of the urine which arise in the convexity and outer part of the kidney, after passing the arch of the blood vessels, go straight toward the center. Here they are gathered together as if into a bundle and end in a kind of papilla in certain animals, so that a whole group of these fibers or little vessels seems to form a many-sided pyramid. Since in some animals they converge into only one unbroken mass (as it were, a large papilla) the vessels of the urine which arise from the whole periphery of the kidney end towards the middle, where the urine is poured out into the pelvis through certain oblong foramina. The individual little mouths of the vessels open on the inside of the foramina, as I have observed in sheep, dogs, cats and other animals. This part of the kidney, formed by the junction and ends of the vessels of the urine, was compared in olden times to the new moon, or to the part of a melon which is divided longitudinally by Nature. And just as in a melon the cortex, which ends in a sharp line, differs from the inner part in substance, so the same condition obtains in the dog's kidney where the part which faces the convexity is red; the other part which looks toward the cavity is white and somewhat bowed and hollowed out in the middle. In other kidneys of this kind, although all the vessels of the urine converge toward the middle and form this elongated semilunar body, from which they pour out the urine, certain rounded collections of the vessels under discussion are sent out from the extensive pelvis, just as in kidneys which are divided into papillae. These swellings, if followed further toward the center, unite and end in the described semilunar bodies. In other kidneys, however, in whose outer surface the remarkable lobules surrounded by furrows are observed, or of which the obscure

CAP. IV

DE RESIDUO SUBSTANTIAE RENUM USQUE AD PELVIM

Extimam gibbi renum partem copiosis excitatem glandulis, vasorum sanguineorum propagibus, & tandem multiplici urinae vasorum fasciculo superius exposuimus, & quoniam continuatam urinae, & sanguinis vasorum productionem usque ad renum centrum, vel pelvim in perfectioribus animantibus observamus, in penatis etiam usque ad ureteris bifurcationem, & dilatationem, ideo necesse est hujus partis historiam prosequi.

Urinae igitur vasa a gibbo, & extremitate renum exorta, superato vasorum arcu, recta versus centrum petunt, & in quibusdam, velut in fasciculum recollecta, in formam papillae desinunt, ita ut tota fibrarum harum, seu vasculorum compages pyramidem plurium laterum referre videatur; in aliquibus, cum in unam tantum continuatam regionem, & veluti extensam papillam conspirent, & tota renis peripheria exorta urinae vasa versus medium desinunt, ubi per oblonga quaedam foramina in pelvim exsudat urina a singulis oscillis vasorum interius hiantium, ut in ovibus, canibus, felibus, & aliis observavi. Haec pars vasorum concursus & finibus excitata antiquitus nascenti lunae, vel peponis parti a natura secundum ipsius longitudinem divisae comparabatur, & sicuti in pepone cortex a penitiori ejus substantia differt, qua in fimam lineam desinit, sic etiam in caninis renibus evenire credebatur, ut ejus substantiae pars, quae gibbam regionem spectat, rubra sit, altera vero, quae cavum respicit, alba, & nonnihil in medio sinuata, & excavata. In consimilibus renibus, licet omnia urinae vasa ad medium concurrentia elongatum hoc semilunare corpus efforment, indeque eruantur urinam, ex extenso tamen pelvi collectiones quaedam dictorum vasorum subrotundae excitantur, sicut in renibus, qui in papillas dividuntur, quae ulterius versus centrum protactae uniuntur, & in descriptum semilunare corpus desinunt; in aliis autem renibus, in quorum extima superficie insignes lobuli foveis circumscripti observantur, vel eorum obscura adsunt vestigia, ut in homine, urinae vasorum concursus incoalescentes quasi papillas conspiciuntur, quae multiplices sunt, & numero etiam variae: & quamvis in his portiones carnis, seu vasorum urinae adhaereant pluribus in locis expando pelvi, certum tamen est omnia haec

vestiges are present, as in man, the courses of the vessels of the urine are seen as unjoined papillae, which are multiple, and vary in number. And although in these kidneys pieces of flesh or of the urinary vessels cling to the expansions of the pelvis in many places, it is certain that all of the vessels extend into a papilla and never open into parts of the pelvis, so that the urine is not excreted through pores of the pelvis, but through the papillae. This I know certainly to be the case in man; for from careful and often repeated dissection I have ascertained that in the human kidney the vessels of the urine, which are like fleshy fibers, firm and compact, end in evident and distinct papillae. These project into the pelvis and are received by a similar number of its tubules. There are generally twelve of these. Beginning from a papilla the branches of these vessels are prolonged to the circumference, as if from a common center in the kidney, and sometimes they are united with other adjacent fibers. From these considerations we can conclude that all the urine is excreted through papillae, which are sometimes round, sometimes oblong, and by no means is it excreted through pores formed in the pelvis, or through any other tortuous body. And although when the pelvis is torn away certain elongated protuberances formed from the urinary vessels may be apparent, which cling closely to the pelvis, it is certain they are not the outer openings of the urinary vessels, but the sides of vessels which are directed toward the papilla.

Among certain people there is a question whether on the extremity of the papillae there is attached a kind of caruncula of a different nature which some have called Verruca, or at least a kind of glandular structure, as there is in the mammary gland, through which the urine is poured out, and by which the ends of the vessels are protected, or at least the chambers of the urine are strengthened. It is certain from the things which I have long observed, particularly in animals where there are distinct papillae, that no body of a different nature is attached, and that the ends of the vessels do not take on a different form but have a suitable opening of their own. For the various vessels of the urine, springing from the glands and prolonged to the papillary body, do not all have the same end, but the urine issues out from a fissure produced in the apex of the papillary body, so that when

vasa in solam papillam tendere, & nequaquam hiare in portiones superextensi pelvis,* ita ut urinae non per porulos pelvis sed per papillas excernatur, quod etiam in homine accidere certo scio, nam ex diligenti, & saepe repetita sectione collegi in humano rene urinae vasa, quae fibras carneas, solidas, & compactas repraesentant, desinere in evidentes, & distinctas papillas, quae in pelvim protuberantes hiant, & ad tot ejusdem tubulis excipiuntur, & ** ut plurimum duodecimum numerum complent; horum vasorum propagines a papilla deductae producuntur velut a centro quodam in renibus circumferentiam & quandoque cum aliis contiguus fibris implicantur, ex quibus concludere possumus omnem urinam per papillas, quae interdum rotundae sunt, interdum oblongae, excerni, & nequaquam per poros in pelvi excitos, vel per aliud tortuosum corpus; & licet ablato pelvi appareant continuatae quaedam protuberantiae ex urinae vasis excitatae, pelvi arcte haerentes, certum tamen est non esse vasorum extrema ora, sed latera in papillam tendentia.

Apud quosdam dubitatum est, an in papillarum extremitatibus caruncula quaedam diversi generis, quam verrucam aliqui dixere, vel saltem glandulosa quaedam substantia appendatur, per quam, veluti in mammillis accidit, urina excernatur, vasorum fines custodiantur, vel saltem urinae camerae stabiliantur. Firmum tamen est ex his, quae diu observavi, in animalibus praecipue, ubi distinctae emergunt hujusmodi papillae, nullum diversae naturae appendi corpus, nec protracta vasa alienam acquirere naturam, sed ingeniosum sortiri hiatum, etenim singula quaeque urinae vasa a glandulis exorta, & ad papillare corpus producta, non eundem omnino terminum assequuntur, sed ab excitata in

* Ita ut urinae portio per porulos pelvis & non per papillas excernatur. Londini, Martyn. ed. 1669.

** Ut plurimum a duodecimum usque numerum ascensu complent; Londini, Martyn. ed. 1669.

this is cut with a knife the exposed openings of the individual vessels of the urine, which are of unequal length, are detected. Sometimes, however, the vessels of the urine and of the blood, prolonged even to the apex of the papilla, are bent back to the sides, where not far from the extremity of the papilla a sort of cavernous opening is observed, in which the individual vessels, both bent and straight, terminate. Therefore, when the papilla is compressed, it pours out urine from this chamber.

Nor is this recent objection important, namely, that the urine cannot be excreted through these papillae, since little grains of sand and little stones sometimes fall from the substance of the kidney, which, when they are of any size, would seem to be incapable of making their way along the capillary canals which form the papillae. Indeed, some people even introduce personal opinions against the indicated courses of the urine in the papillary passages. Although it is absolutely true that the urine is by no means separated from the blood vessels by the papillary body, as by a sieve, yet it cannot be denied that it is excreted through it just as it is through the peripheral parts of the tubules. For the papilla is merely a fusion and opening of the vessels themselves, since the hollow ends of the urinary vessels clearly lie in it. Moreover, it must be admitted that small grains and little calculi may be excreted from such vessels, provided only their size is small, since the urinary vessels are membranous, and therefore distensible. Now it frequently happens that small stones are held in these membranous ducts and are enlarged by the accretion of tartar, so that they injure the delicate membrane of the vessels and consequently the flesh of the kidneys is often observed to be destroyed.

The whole section of the kidney thus far described has its own blood vessels, which spring from the arcuate branches and, prolonged downward, embrace the vessels of the urine like an ivy. And in animals which are still living, when the renal vein is tied, these vessels become so swollen with blood that there is more blood confined here than in the other little vessels. These vessels, however, are lost near their end toward the papillary body, where, from the delicateness of the blood vessels and density of the urinary vessels, a membranous or sinuous body is seen. And I have often doubted whether this sinuous body is invested by a

apice papillaris corporis fissura emanat urinam, ita ut hac diducto cultro, singulorum urinae vasorum inaequaliter elongata extrema ora deprehendantur; aliquando autem urinae, & sanguinis vasa usque ad apicem deducta reflectuntur ad latera, ubi non longe ab extremitate papillae foramen quoddam cavernosum observatur, in quod singula vasa & reflexa & recta desinunt, unde compressa papilla urinam totam inde promittit.

Nec urget id, quod novissime objicitur, per papillas hasce urinam nequaquam excerni, cum arenulae, & lapilli quandoque e renum substantia decidunt, qui, cum mole polleant, videtur impossibile, quomodo capillares canaliculos, quibus papillae coagmentantur, permeare possint: quin & sensum in testimonium afferunt contra urinae vias in papillaribus meatibus assertas; etenim, licet verum absolute sit urinam nequaquam papillari corpore, ut cribro, separari a vasis sanguineis, negari tamen non potest per hoc, veluti per extrema urinae secretoria vasa, excerni, cum sit ipsorum tantum coagmentatio, & hiatus, cum evidenter perforati pateant fines; exiguas autem arenulas & calculos excerni ab hujusmodi vasis admitti potest, dummodo ipsorum exigua sit moles, cum urinae vasa membranosa sint, & consequenter extensibilia: accidit tamen, & frequenter, calculos in hujusmodi urinae ductibus detineri, & adveniente tartaro augeri, ita ut vasorum tenuem corrodant membranam, & ita corrupta non raro renum caro observatur.

Tota enarrata huc usque renum portio sua habet sanguinea vasa, quae ab incurvatis ramis propagata, & deorsum protracta hederarum instar, urinae vasa amplexantur, & in animalibus adhuc viventibus, ubi emulgens vena jam ligata est, ita turgent sanguine, ut major coerciti sanguinis copia hic subsit, quam in caeteris vasculis. Haec autem vasa obliterantur prope finem versus papillare corpus, unde ex horum gracilitate, & vasorum densitate membraneum, seu nervosum corpus videtur, & saepius etiam dubitavi, an reflexi pelvis tunica investiat, cum arcte ejusdem amplexantis sinibus annectantur: in capris autem, cum

reflection of the tunic of the pelvis, although these vessels are closely connected by its folds. Moreover, since in the goat I have observed nothing between the pelvis and the mass of the urinary vessels, I think this is by no means constant in all cases.

CHAPTER V

THE BRANCHES OF THE BLOOD VESSELS AND OF THE PELVIS

It is generally agreed that the whole kidney is supplied by the branches of the renal arteries and veins. Now the renal artery and vein enter the hollow of the kidney and are divided into many remarkable small branches. These follow the expansion of the ureter, which is called the pelvis, through a mass of fat. And where its terminations (called Tubules) extend from the pelvis about the papillae, they are prolonged toward the convexity of the kidney as if in the same little sac with the papillae and then are curved to form a bow, and there meet other branches and anastomose with them. From this arch many branches are directed toward the convexity and outer part of the kidney, and others, themselves forming an interweaving reticulum, run between the lobules into which the mass of the urinary vessels is divided, as far as the outer surface, from where, reflected in different directions to the sides, they end in the deeper parts of the kidney. If ink is injected the twig-like appearance of these vessels is very prettily shown. The final minute branches end at the glands described above. Now a sort of semicircular space is formed by the diverging tubules of the pelvis and the arch of the blood vessels. This is filled by the urinary vessels, collected into the papillary body, and here branches of blood vessels which are formed into an arch beneath the convexity emerge in different directions and are mutually united by anastomosis. The spaces thus formed, according to some observers, are like a honeycomb. The course of these blood vessels (shown by the blood they contain) is downward from the arch around the urinary vessels.

In certain lower animals, and especially in a fetus, I have often observed a blood vessel running through the outer part of the kidney by the numerous bendings of whose branches the smaller divisions of the kidney are divided into lobules, and whose small branches pervade

nullam observem inter pelvim, & urinae vasorum collectionem, hoc nequaquam in singulis perpetuum censeo.

CAP. V

DE VASORUM PROPAGINE, & PELVI

Arteriarum, venarumque ramis totam renum substantiam irrigari apud omnes totum extitit, emulgentes etenim arteriae, & venae cavum renum subintrantes in plures surculos, hosque insignes distributae, extensum ureterem, qui pelvis dicitur, inter adipis molem excurrentes, tandem ubi appendices quaedam, quas tubulos dixere, quae circa papillas a pelvi elongantur, versus gibbum, eodemque veluti sacculo contentae in arcum curvantur, aliisque ramis obviam eunt, & anastomosi uniuntur, ab hoc arcu versus renis gibbum, & extremitatem propagantur plures, & plures propagines, quae & ipsae implicationem quandam reticularem promunt, & inter lobulos, quibus urinae vasorum congeries subdividitur, excurrunt usque ad extimam superficiem, & quo aequaliter ad latera reflexae tandem interius terminantur, & harum speciosam sobolem immissum atramentum perbelle describit; desinunt horum extremi surculi ad glandulas superius descriptas. Et quoniam ab extensi pelvis tubulis, & a vasorum arcu subrotundum quoddam spatium describitur, quod ab urinae vasis in papillare corpus coagmentatis repletur, ideo hinc inde emergunt rami, in arcum sub gibbo ducti mutua anastomosi uniti, quorum descripta spatia ex nonnullorum observatione favos referunt. Horum etiam vasorum propagines ab arcu etiam infra circa urinae vasa feruntur, quae contento sanguine manifestantur.

In quibusdam brutis, & praecipue in foetibus, per renis exteriorem portionem sanguineum vas excurrere saepius observavi cujus crebris ramorum flexibus renum minores divisiones in lobulos ambiuntur, & interiores etiam lobulorum rimulae pervaduntur, his tandem desinentibus in

even the interior of the lobule. These also end in the glands. I disregard the expansion of the blood vessels into a cavity, as the ancients imagined, which many have vigorously attacked.

Among the vessels of the kidney the ureters seem to hold not the least important place. But about their origin and final insertion many may disagree. I will add this one thing to their arguments, to show how far indeed some were deceived by the idea of the pelvis running through the body of the kidney with the other vessels: namely, that the pelvis is an extension of the ureter, formed by the same membranes and sinew-like fibers of which the ureter is composed. In animals in which the urinary vessels end in a papillary body, a peculiar, nearly oval expansion of the ureter is observed in the middle part of the kidney, which in the region of the hilus forms certain tube-like appendages to the papillae. These, prolonged further toward the convexity, are bent back to the sides, as if forming an infundibulum, which is accepted by many as a second cavity or sieve, and surround closely one or another papilla projecting within them. From these divisions of the pelvis further branches go out, which follow the ramifications of the blood vessels and form exactly the same networks of these little tubes which we have said are made by the arteries and veins. From the terminations of the pelvis, which are formed into an arch, innumerable membranous, or if you prefer, sinuous, fibers are prolonged almost to the convexity, whose terminations I have never been able to reach.

In other animals, such as cattle, dogs, etc., in which instead of papillae a sort of extensive body like a half moon is observed, the pelvis has expansions which surround the bundles of fibers as they end in this single semilunar body. And since the extremities of the urinary vessels end at the cavity of the pelvis, the secondary cavities of the ancients, described above, and which simulate the shape of a funnel, are not observed. Instead, portions of the pelvis, like tenuous vessels, are disseminated through the whole periphery of the kidney in the same manner as has been described before. In man the pelvis is of greater size and is unbroken throughout, except for round foramina through which it is connected with the papillae (which are formed by the pressing together of the urinary vessels), or receives them within itself.

glandulas. Hic omitto sanguineorum vasorum expansionem in cavitatem a veteribus imaginatam, quam plures nervose oppugnarunt.

Inter renum vasa non infimum locum habere videntur ureteres, de quorum quidem exortu, & ultima insertione litigent alii; illud unum his adnotabo, quatenus quidem sub pelvis specie per renum corpus cum caeteris vasis disseminantur, esse pelvim extensionem ureteris iisdem constantem membranis, nerveisque fibris, quibus ureter componitur; in brutis in quibus urinae vasa in papillare corpus desinunt insignis quaedam ureteris per medium renis, quasi ovalis expansio, observatur, quae e regione hiatus papillarum appendices quasdam tubulosas promit, quae versus gibbum ulterius protractae latiores redditae, quasi infundibulum efformantes, quod pro secunda cavitate, vel pro cribro acceptum a plerisque est, admissam intra se unam, vel alteram papillam arcte amplexatur: ab his posteriores propagines promuntur, quae subsequentes contentorum sanguinis vasorum ramificationem, easdem omnino implacationes alveolorum edunt, quas ab arteriis, & venis excitatas diximus; a pelvis etiam appendicibus in arcum productis membranosa, nisi major nervae fibrae innumerae fere versus gibbum producantur, cujus extremos fines unquam attingere potui.

In caeteris animalibus, ut in pecude, cane, &c., in quibus papillarum loco extensum quoddam corpus semilunae simile observatur, pelvis expansiones habet, quae fibrarum fasciculos in hujusmodi continuatum semilunare corpus desinentes amplexantur; & quoniam extrema urinae vasorum ad pelvis cavitatem desinunt, ideo secundae antiquorum cavitates superius descriptae infundibuli formam aemulantes non deprehenduntur, sed pelvis istae portiones, velut extensa vasa, eadem methodo paulo ante descripta per totam renum peripheriam disseminantur. In homine pelvis arctior est latitudinis, totusque continuus est, praeter rotunda foramina, quibus nectitur, seu admittit papillas urinae vasis conglobatas: aliquando ureter humanus ante ingressum dividitur, veluti sanguineum vas in plures fistulas, quibus expansio

Occasionally the human ureter is divided like a blood vessel into many little passages, by whose expansions the pelvis is formed, and from which tubules are prolonged to receive the papillae. This condition I have frequently seen in a pig. From these expansions of the ureter stones with irregular projections of tartar are frequently observed extending into the pelvis, the tartar having been condensed and shaped in accordance with the pelvis' appendages. The deeper branches of the pelvis, toward the convexity of the kidney, and in the reticular plexus, bind together the fasciculi of the urinary vessels which are compressed into the papillae, and also form a sort of envelope for the blood vessels, which, however, is not observed in certain lower animals.

The form of the bird's ureter or pelvis is complex, for through the whole concave, whitish length of the kidney runs a peculiar vessel from which here and there branches are given off. These branches, perceptibly widening and shaped like a trumpet, receive innumerable collections of white vessels which have proceeded from the periphery, so that one wonders whether these white vessels are produced by a spreading out of the pelvis, as fingers go out from the hand, or whether these wider portions of the pelvis are like a funnel into which the numerous white vessels of the urine discharge their fluid. The latter are gathered together by an interweaving into a narrow body which is analogous to the little kidneys in cattle and the lobules of the bear. From these observations I have long doubted whether the excretory vessels of the urine are branches of the ureter.

CHAPTER VI

THE FUNCTION OF THE KIDNEYS

The constant trickle of urine from the kidneys through the ureters, thence carried to the bladder, and voided at a fixed interval, is sufficient indication of their function. But by what means this is accomplished is most obscure. It is reasonable to assume that this is wholly the result of the work of the glands: but since the minute and simple structure of the openings within the glands escapes us, we can only postulate some things in order to give a satisfactorily probable answer to this question. It is obvious that this mechanism accomplishes the work of separation of the urine by its internal

sit pelvis, a quo propagati tubuli occurrentes recipiunt papillas, quod etiam in sue non raro conspexi; ex hac ureteris expansione lapides renum frequenter cum protuberantis tuberosis observantur ex tartaro in pelvi, ejusque appendicibus concreto, & configurato: propagines etiam pelvis versus gibbum, & interiores reticulari plexu, vasorum urinae fasciculos in papillas detinentes colligant, & expansis etiam sanguineis vasis aliquale involucrum praebent, non quale tamen in brutis quibusdam observatur.

Pennatorum ureteris, seu pelvis elegans est forma, etenim per totam renum concavam longitudinem subalbam quoddam excurrit vas, a quo hinc inde rami promuntur, qui sensim latiores, tubae instar, facti, innumeras alborum vasorum collectiones admittunt a peripheria progressas, ita ut haereas, an haec candida vasa a lacinato pelvi, & veluti exeuntes digiti a divisa manu promantur, an vero hae latiores pelvis portiones sint instar infundibuli, in quod copiosa illa alba urinae vasa serositates exonerent; haec in exiguum corpus implicatione conglobantur, quod cum renalibus in bove, & ursis lobis proportionem habet: ex harum observatione interdum dubitavi, an excretoria urinae vasa essent propagines ureteris.

CAP. VI

DE RENUM USU

Extillans perpetuo urinae serum a renibus per ureteres, indeque in vesicam delatum, & stato tempore excernendum, renum usum sufficienter indicat; quam arte id contingat obscurissimum: licet enim glandularum ministerio totum hoc subsequi rationi sit consonum, quoniam tamen minima illa, simplexque meatuum in glandulis structura nos latet, ideo quaedam tantum meditari possumus, ut huic quaesito probabiliter satisfaciamus: necesse est hanc machinam interna configuratione separationis opus peragere; an vero his, quae ad humanos usus passim usurpamus, quibus fere consimilia effin-

arrangement. But whether this arrangement is similar to those devices which we make use of here and there for human needs, and in imitation of which we build rough contrivances, is doubtful. For although similar sponge-like bodies, structures with sieve-like fistulae, may be encountered, it is difficult to determine to which of these the structure of the kidneys is similar in all respects. And since the manifestation of Nature's working is most varied, we may discover mechanisms which are unknown to us and whose operations we cannot understand.

I marvel at this, that so many different substances are separated through these glands by the process of Nature, for water with salty, sulphurous and similar particles goes through, and in disease the remains of abscesses, and sometimes the defiled particles of the whole body are separated from the parts of the blood which are retained. These blood particles are many, and not all of one form. Nevertheless, as I think, Nature has made the structure of these glands very small and most simple, so that we cannot doubt that those things which are excreted through the urinary vessels go together into one mass, so that the particles of salt and other substances entering in turn form one great body of definite shape. And whatever is of larger size or of different shape does not enter the little pores and small spaces of the excreting body, and is not excreted. From this it follows that there escapes through these urinary glands what otherwise is useful to the animal economy. For particles similar to all of these which are excreted remain in the arteries and veins for the use of the animal. And those things which are merely separated, and excreted as useless, being rendered freer by intestinal fermentation and almost separated from the rest, flow out of necessity in so far as they meet this structure, and thus advantage accrues to the animal, so that less disorder is caused in the body, transpiration is more easily carried on, and the burdens of the various functions of the animal are lightened. In confirmation of this I have observed occasionally that when the arterial blood has been made thinner by the force of its onward motion or by violent agitation, that the urine is bloody; this subsides as the blood grows thick again. And in these circumstances blood particles produce swellings in the neighborhood of the testes and other parts, where new passages have been made for them. Thus, for separating

gimus, consonet, dubium; licet enim occurrant analogae spongiae, incerniculi fistularum cribrorumque structurae, cui tamen ex his consimilis undequaque sit renum fabrica, difficillimum est assignare, & cum naturae operandi industria foecundissima sit, ejusdem ignotae nobis repentiur machinae, & quas nec mente quidem assequi licet.

Illud miror tam copiosa, diversaque corpora per has glandulas separari in naturae statu, cui enim substantia aquea cum salinis, sulphureis, & consimilibus particulis, & ex morbo etiam abscessuum reliquiae, & totius quandoque corporis inquinamenta separantur dententis sanguineis partibus, quae & ipsae plures sunt, nec unica fortasse forma constantes, & tamen minimam, & simplicissimam, ut puto, harum glandularum structuram Natura efformavit, ex quo dubitari possumus, ea, quae per has urinae vias excernuntur, in unam quasi coe molem, ita ut salium, & similium adinvicem subintrantes particulae unum tantum efficiant determinatae figurae corpus, & quidquid majoris corporis, vel diversae saltem figurae minutulos, & minimas intercapedines excernendi corporis non subintrat, illud non evacuari, ex quo etiam sequi potest per has urinae glandulas elabi, quae alioquin utilia animalis oeconomiae sunt; nam singulis his excretis similes adhuc portiones remanent in arteriis, & venis ad animalis usus, eaque tantum separantur, & veluti inutilia excernuntur, quae liberiora, & plus justo exaltata ex intestina fermentatione a caeteris pene sejuncta effluunt necessario, dum structuram hanc offendunt, indeque animali illud proficuum succedit, ut minores in corpore turbationes excitentur, facilius transpiratio celebretur, aliarumque animalis operationum impedimenta tollantur. In hujus confirmationem observavi interdum plus justo colliquo ebulliente sanguine vi praegressi motus, vel vehementis agitationis, urinam reddi sanguineam, subsidente etiam grumesciente sanguine, & in his sanguinis portiones ad testes aliasque partes nova sibi facta via, tumores excitasse; unde ad separandam urinam, praeter renum structuram, perpetua concurrit sanguinis fermentatio, quae solutae, & liberiores redditae salinae, & aquae particulae facilius occurrente structura excipiuntur.

the urine, in addition to the structure of the kidney, the fermentation of the blood is a continual aid, by which particles of salts are released and rendered freer and the watery particles are more easily taken out by the structure which they meet, and are separated from the residue; and as these particles vary, the quality of the urine and excretion is changed.

Diseases also are manifest in the urine through harm to these very delicate structures which are injured by the tartar which accumulates there or by the particles of salts as they go through. But for the most part the abnormalities appearing in the urine spring from disease of the blood coming to the kidneys, and particularly those hereditary diseases whose diathesis is not developed in the structure of the kidney, but is in the blood. For a disease of this kind, as gout, frequently changes the kidney in accordance with the change of other parts. And in truth, I confess, that in our bodies there is no other part except the lungs which is more subjected to the faults of too much blood and which can more clearly indicate the faults of the blood by its own suffering than the kidneys.

The little glands of the kidney suffer from all the diseases peculiar to glands, which for the sake of brevity in our studies we omit.

The excretory vessels of the urine, which are called fibers, aid the production of excretory hairs in the urine. For in birds, in which the urine is coarser and more compact, like half-curdled milk, the small branches of the ureter, as they admit this coarser fluid as it flows in, give it that elongated and rounded shape which is still maintained intact when it enters the wider pelvis. Therefore the formation of hairs is fostered by the varied faculty for growing of the substances excreted through these delicate kidney glands. For it can happen that occasionally an accumulable particle of fluid or of the fibers gets out from the minute pores of the glands, and while it is being carried through the excretory vessels into the pelvis takes on this rounded figure by growth. Nor can we doubt that the same takes place with the salts and liquids which retain an easy form for growing, either because they are separated from their companions which are given back, or because they are fixed by some new association, whence they easily adopt the form of hairs in the narrow tubules of the urinary vessels and retain this shape when carried further down, a condi-

tur, & a residuo separantur, & his variatis urinae qualitas, & excretio immutantur.

Contingunt autem in urina vitia labe quidem minimae hujus structurae, quae a concrecente ibi tartaro, vel pertranseuntibus salinis particulis laceratur, sed ut plurimum a vitio appellentis sanguinis dependent, & praecipue haereditarii illi morbi, quorum diathesis non in renum perpetuo structura sed in sanguine propatatur, etenim renum hujusmodi morbus non raro in consimiles aliarum partium, scilicet in podagram immutatur. Et ut verum fatear in nostro corpore, praeter pulmones, non est alia pars, quae exundantis sanguinis injuriis magis subjiatur, ejusque vitia facilius indicare compatiendo possit, quam Renes.

Laborant Renum minimae glandulae omnibus, morbis glandularum propriis, quos brevitati studentes omittimus. .

Urinae excretoria vasa, quae fibras dixere, pilorum per urinam excretorum generationem promovent; etenim in avibus, quibus urina crassior, & compactior est, instar semiconcreti lactis, ureteris illae minimae propagines, dum affluentem hunc crassiorem succum admittunt, oblongam illam, & teretem eidem impertiunt figuram, quae in eodem, licet in latiori pelvi recepto, adhuc conservatur, quare ex diversa serositatis per renum has minimas glandulas excretae dispositione ad concrendum pilorum promovetur generatio: accidere etiam potest, ut interdum portio concrescibilis seri vel fibrarum a minimis glandularum meatibus excidat, & dum per excretoria vasa in pelvim defertur concrendendo teretem hanc figuram acquirat. Idem dubitari possumus de salibus, & liquoribus qui facilem ad concrendum retinet figuram, vel quia a consociis sejunguntur, quorum miscella fluxiles redduntur, vel quia aliquo de novo associato fixantur, unde de facili in vasorum urinae arctis | tubulis in pilorum formam configurantur, quam etiam ulterius delati retinent, quod morbi genus mammillis familiare scimus.

tion which we know well in diseases of the mammary gland.

In addition it is commonly said that narrow little bits of flesh are excreted by the kidney, which probably are particles of blood mixed with the excrement of the urine, or perchance the coverings of the excretory urinary vessels, which can be eroded by the fluid passing through them and are then carried down and out with it.

The ureter, expanded into the pelvis, is affected by worms and particularly by calculi, for if one of the saline or tartar particles which are continually flowing out is ensnared by the pelvis it fosters the beginning of a stone. For it is clear that it would meet the particles that pass through and detain those like itself, so that the stone grows from all these particles which are massed together. On this account perchance Nature has added the pelvic fat, so that its interior surface may be continually kept smooth.

Many have had the idea that the material of reproduction is produced in the kidney; on this account in gonorrhea medicaments are applied to the loins. Also the kidneys are commonly accredited to be the seat of passion. A certain association of the spermatic vessels with the kidney has long favored this opinion. Since, however, nothing is directly derived from the kidney or its vessels for the formation of semen, it does not seem that the kidneys prepare the peculiar material for the formation of semen, but seem to share in a general and indirect rearrangement of the blood that goes through them (which, however, ought not to be overlooked) so that the semen is finally formed by the blood's various siftings. Moreover, it is probable that the particles of semen are separated at the testes from the body fluids brought to them, and the semen mass is formed from all the various parts of which the animal body is made up. And since these parts obtain their rude salt and primal origin from the arteries, if the mass of blood is purified by the functions of the viscera, the digestion of the remaining particles is improved. Therefore, it is not strange if those saline and other particles which are sifted out and excreted by the kidneys can not only injure the material of reproduction while they remain in the body by their presence and freedom, so that this is infertile, or at least the inherent disposition and tendency for rejecting the seed or abortion is increased, but

Vulgatum insuper est, exiguas carunculas a renibus excerni, quae probabiliter sunt grumescantis sanguinis particulae cum urinae faeces commixtae, vel saltem excretoriorum urinae vasorum tunicae, quae pertranseunte sero erodi possunt, eidemque unitae deorsum ferri.

Ureter etiam in pelvim expansus vermibus, & ut plurimum calculis afficitur, si enim ex affluentibus perpetuo tartareis, salinisque particulis ex illis una a pelvi irretiatur, lapidis rudimentum promovet; facile namque est, ut pertranseuntibus occurrat, & consimiles detineat, ita ut exconglobatis pluribus hisce particulis lapis assurgat, unde forte natura pelvi pinguedinem subiecit, ut continuo interior ejus superficies lubrica redderetur.

Renibus seminis materiam praeparari pluribus arrisit, quare in gonorrhea lumbis medicamenta apponuntur, ipsique libidinis sedes vulgo crediti fuere: hanc diu fovit sententiam vasorum spermaticorum cum renibus aliqualis societas; quoniam tamen a renibus, ejusque vasis nihil in seminis officinas immediate derivatur, ideo non videntur renes peculiarem praeparare materiam pro seminis generatione, sed universalem quandam, & remotam, non spernendam, dispositionem pertranseunti sanguini impertire, qui variis tandem cribrationibus ultimo semen efficitur; etenim probabile est seminis particulas ex appulsis ad testes succis separari, fierique diversarum, omniumque partium, quibus animalis corpus inde coalescit, congeriem: & quoniam hae partes ab arteriis rudem saltem, & primaevam originem deducunt, ideo si defaecatio vi viscerum reddatur sanguinis massa, subsequentium etiam coctiones eo perfectiores celebrabuntur; quare nil mirum si salinae illae particulae, aliaque per renes cribranda, & excernenda, dum remaneant, non solum sua praesentia, & libertate seminis materiam inficere possint, ita ut infoecundam reddatur, vel saltem ad propugnandam molam, vel abortum praeviae dispositiones, & incitamenta foveantur: sed probabile insuper est harum particularum detentione fixari quandoque seminis minimarum particularum deciduam, vel a toto, vel a sanguinea massa emanatem substantiam; quapropter ubicunque exacta glandularum in renibus

probably in addition, by detaining those particles, there is fixed at some time the cast-off part of the small particles of "semen," springing either from the whole body or from the blood. On the other hand, when the mass of the blood is purified by the proper structure of the glands in the kidney excreting the harmful saline particles, fermentation is more easily carried on, and the beginnings of like and unlike parts are picked out and separated by the testes and then recollected again, and so the semen flourishes more fertile.

(existentium structura sanguinis massa hujusmodi exaltatis) salibus & inquinamentis liberatur, facilius fermentatio perpetuatur, similium, & dissimilium partium rudimenta ducuntur, & testium fabrica separantur, indeque recollectum semen foecundius viget.

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THE ETHER TRAGEDIES

By JAMES MOORES BALL, M.D.

ST. LOUIS, MO.

BOOKS are like people: they carry either joy or sadness in their faces. These qualities may be concealed by a person; but the face of a book, which is its title-page, does not admit of dissimulation. Its grave or gay look lasts so long as print and paper hold together.

One day a dusty little volume of 134 pages looked up sadly to me, as if saying, "Don't you pity the man who wrote me?" It was "A Manual of Etherization," written by a Chevalier of the Legion of Honor, a chemist and scientist, Dr. Charles T. Jackson, one of several men who claimed the honor of abolishing pain during surgical operations.

*Sup J. M. Luister
with the requests of
the Author*

Charles T. Jackson

March 3^d 1867

SIGNATURE OF DR. CHARLES T. JACKSON.

Its face shows that it was born at Boston, in 1861. It is a presentation copy, and as such very properly carries an inscription legibly written by its author. Just as the best of our living friends naturally have gravitated toward us with the least expenditure of effort or of money, so it is with many of our books. This volume cost the noble sum of ten cents. Yet what a tragedy mars its face!

The month is February: the year, 1842; the place, a public hall in Boston; the occasion, a lecture on chemistry; and the lecturer, Charles T. Jackson, a scientist who began his eventful career by making a geological and mineralogical survey of Nova Scotia, an account of which he published in 1827, in his twenty-first year.

Suddenly something happened; a large glass jar filled with pure chlorine broke, and the lecturer got his lungs filled with the irritating gas, which endangered his life. He immediately had ether and ammonia brought, and alternately inhaled them with great relief. The next morning he awoke in pain: his throat was inflamed, respiration was difficult, and his breath gave a distinct flavor of chlorine. "I determined therefore," he says, "to make a more thorough trial of ether vapor, and for that purpose went into my laboratory, which adjoins my house in Somerset Street, and made the experiment from which the discovery of anesthesia was deduced."

The experiment consisted in the inhalation of a considerable amount of ether, which relieved all sensation of pain and caused a short period of unconsciousness.

Reflecting on these phenomena, the idea flashed into my mind that I had made the discovery I had so long a time been in quest of—a means of rendering the nerves of sensation temporarily insensible, so as to admit of the performance of a surgical operation on an individual without his suffering pain therefrom.

From such a casual and humble beginning there arose a series of experiments and observations, ending in the discovery of anesthesia—the greatest benefit that our country has conferred upon a suffering world.

Jackson's duties seriously interfered with his experiments. In 1845, he opened copper mines and also discovered iron mines in the Lake Superior district, and two years later he was appointed by Congress to survey the mineral lands of Michigan.

Jackson informed a number of chemists, surgeons, and dentists (one of whom was W. T. G. Morton) of his discovery; and suggested that ether be used to prevent the pain of dental and surgical procedures. Rival claimants for the honor of discovering

anesthesia appeared. Morton and Wells were the chief contenders who tried to wrest the chaplet from the brow of Jackson. It would be useless here to discuss their rivalries, their claims and counterclaims, the patenting of ether by Morton under the name "Letheon," the controversial literature which formed a veritable flood, and the widely divergent opinions of all who have studied the question of priority in this discovery. At this late day it would appear that there was enough of honor to satisfy all contestants—but not so.

And how did it all end?

Horace Wells (1815-1848), on December 11, 1844, persuaded Dr. G. Q. Colton, a well-known lecturer on popular scientific subjects in America, to administer nitrous oxide gas to him so that Dr. John M. Riggs might extract a large molar tooth from his (Wells') upper jaw. On regaining consciousness, Wells exclaimed: "A new era in tooth-pulling!"

Wells attempted to establish his claim to priority in the discovery of anesthesia; but he became disheartened, and in 1848 having first inhaled ether to make death painless, Wells opened his radial artery and died a suicide: *Ether Tragedy No. 1*.

W. T. G. Morton (1819-1868), a pupil to whom Jackson, on September 30, 1846, had suggested the use of ether as an anesthetic, on Friday, October 16, 1846, in the Massachusetts General Hospital, in Boston, successfully etherized a patient from whose neck a congenital vascular tumor was excised by Dr. John C. Warren. Jackson, who was invited by Dr. Warren to give the anesthetic, was unable to be present.

Morton spent the remainder of his days in the futile attempt to obtain the sole credit of rendering surgical operations painless. Year after year, to use the words of the Hon. Truman Smith,¹ his time was spent "harrassing the two Houses of Congress with importunities for a national recognition and reward." Morton died, July 15, 1868,

¹Smith, T. *An Inquiry into the Origin of Modern Anesthesia*. Hartford, 1867.

in Central Park, New York City, during an attack of violent excitement, or possibly of acute mania, which had been caused by a recent publication in regard to the discovery of anesthesia: *Ether Tragedy No. 2*.

Charles Thomas Jackson (1805-1880), the gentleman and scientist whose acci-

A

MANUAL OF ETHERIZATION:

CONTAINING DIRECTIONS FOR THE EMPLOYMENT OF

ETHER, CHLOROFORM, AND OTHER ANÆSTHETIC AGENTS,

BY INHALATION,

IN

SURGICAL OPERATIONS,

INTENDED FOR MILITARY AND NAVAL SURGEONS, AND ALL WHO MAY BE EXPOSED TO SURGICAL OPERATIONS; WITH INSTRUCTIONS FOR THE PREPARATION OF ETHER AND CHLOROFORM, AND FOR TESTING THEM FOR IMPURITIES.

COMPRISING, ALSO,

A BRIEF HISTORY OF THE DISCOVERY OF ANÆSTHESIA.

BY CHAS. T. JACKSON, M. D., F. G. S. F.,

Chevalier de la Légion d'Honneur; Caltiere dell'Ordine del S. S. Maurizio e Lazzaro; Ritter des Rothen Adlers; Knight of the Turkish Order of the Medjidieh; Member of numerous Scientific and Medical Societies in Europe and America.

BOSTON:

PUBLISHED FOR THE AUTHOR BY J. B. MANSFIELD,
39 Court Street.
1861.

TITLE PAGE OF JACKSON'S "MANUAL OF ETHERIZATION,"
BOSTON, 1861.

dental inhalation of chlorine gas had led to a trail which ended in the giving of painless surgery to a waiting world, also had his troubles. The constant worries incident to the controversies in which he became involved sapped his strength and finally deranged his brilliant mind. After seven years of insanity, Jackson died in an asylum at Somerville, Massachusetts, August 28, 1880, aged seventy-five years: *Ether Tragedy No. 3*.

How sad were the lives of these benefactors, how tragic their deaths, and how unnecessary were their disputes!

They were ignorant of the greatest tragedy of all: They did not know, what has been established beyond a question of doubt, that a modest country doctor, living in a village far removed from a railroad, had anticipated their use of ether in surgical operations. It was on March 30, 1842, at Jefferson, Jackson County, Georgia, that a small cystic tumor of the jaw had been excised without the smallest consciousness of pain; and that a few weeks later a similar tumor, situated on the same side of the neck of Mr. James Venable, had been removed painlessly, *under ether anesthesia*, by Dr. Crawford W. Long.² This gentleman was neither chemist nor dentist. He was an old-style country practitioner who had received the degree of Doctor of Medicine from the University of Pennsylvania in the year 1839. They did not know what is now known, that Dr. Crawford W. Long, in 1849, had read a paper before the Georgia State Medical Society, giving a clear and accurate account of the first use of ether in surgery.

The modesty of country doctors is well known, and Dr. Long was not an exception to the rule. It was not until the year 1854

² It will be noticed that on page 278 of the present issue of the ANNALS, Mrs. Tayler quotes the account by her father, Dr. Long, of his first use of ether as an anesthetic. According to it the first operation in which he used it was that on Mr. Venable, on March 30, 1842. Long makes no mention of any prior operation in which he used ether.

that Dr. Long, at the earnest request of his friends, consented to present his name as a claimant for the honor of the great discovery. At no time was he actuated by hope of pecuniary reward. When Charles T. Jackson was told of this new Richmond in the field, he called upon Dr. Long and graciously acknowledged the country doctor's right to priority. In the *Boston Medical and Surgical Journal*, April 11, 1861, Dr. Charles T. Jackson declared that Dr. Crawford W. Long was justly entitled to the honor of being the discoverer of ether anesthesia. By this act Dr. Jackson proved himself to be a true Chevalier, a worthy member of the Legion of Honor.

It is pleasing to know that Dr. Francis R. Packard³ has presented these facts in a convincing manner. And, also, it is a source of satisfaction to all who love the Truth, and nothing but the Truth, to recall the tribute which, on March 30, 1912, was paid by his alma mater, the University of Pennsylvania, to the memory of Dr. Crawford W. Long, who first used ether as an anesthetic in surgery.

On that date, in the presence of a distinguished audience, a daughter of Dr. Crawford W. Long unveiled R. Tait McKenzie's bronze medallion in honor of the man who proved the prediction that, "Neither shall there be any more pain."

The face of the little book is turned toward me, and again it seems to say, "Don't you pity the man who wrote me?"

I do.

³ Packard, F. R. *History of Medicine in the United States*. Phila., 1901.



CRAWFORD WILLIAMSON LONG

By FRANCES LONG TAYLOR

ATHENS, GEORGIA

THIS little sketch of an old-fashioned Georgia doctor was not originally written for publication, but for Dr. Long's grandchildren, that they might learn of his unselfish Christian character, and with the hope that his example might incite them to noble thoughts and deeds. For this reason the intimate details of his household are given. There was also the desire that they should know of the Southern gentleman of a vanished day, with the tremendous responsibilities that were his by inheritance and the duties they involved, the loss of fortune by reason of the war between the states, and the brave struggle against poverty. It is also fitting that they should have the facts of his discovery and professional career, as taken from his private papers and letters.

The persuasions of friends have induced me to publish these simple annals fully conscious that they have not the merit of being finely phrased.

I cannot say, as did Canning's Needy Knife Grinder: "Story, God bless you, I've none to tell, sir." I have a story to tell of one whose life, in many ways successful and happy, was in one respect tragic: tragic because his heart's desire to be known as a benefactor of mankind was not universally recognized. It is eighty years since the young physician, only twenty-six years of age and almost a stranger in the small town in which he had located six months before, performed the first painless operation in surgery, on March 30, 1842.

The patient, the four witnesses and the surgeon, who was my father, Crawford Williamson Long, are sleeping the last sleep. As secretary to Dr. Long during the last years of his busy life, copying the papers which bore upon his discovery of ether anesthesia, my frequent conversations with him and correspondence with the

witnesses of the earlier operations have given a clearer knowledge of his work to me than any person now living.

Many sketches and monographs have been published concerning him and his discovery but little is known of his personal characteristics except by his friends and surviving children. The desire that his grandchildren should learn of his noble, unselfish life and also that of his wife, who was an inspiration in his days of prosperity and his comfort in those of adversity, has prompted me to write this sketch. A life so exemplary and full of high ideals from his boyhood to his death was largely the result of heredity and environment and he realized that it was a call to high endeavor. He knew also that "character is the only exact measure of anyone's might in the world of action"; he was thus animated by high ideals. Regarding his chosen profession he said: "My profession is to me a ministry from God. I am as much called upon to practice medicine as a minister is to preach the Gospel."

With these views, it is not to be wondered at that when a young man he would talk to his mother about the horrors of surgical operations, and that some method should be found to alleviate the sufferings of patients under the knife. His thoughts dwelling upon this subject, his alert mind found the remedy. He always said in reference to his discovery of anesthesia by the use of sulphuric ether: "The mystery is that it was not discovered long before."

Crawford Long's father, James Long, was born in Carlisle, Pennsylvania, in 1781. When he was nine years of age his father, Samuel Long, at the head of a number of Scotch-Irish Presbyterians, came south and after reaching Georgia, settled at old Petersburg, now known as one of the dead towns of Georgia, but at that

time the most important place on the Savannah River between the cities of Savannah and Augusta. Realizing that Petersburg would not prosper they moved into the fertile lands of the Broad River in Madison County, Georgia.

James Long was studious, fond of reading and received the best advantages the country then afforded. He inherited some money and negroes from his father and while yet a young man, by his industry and energy, had accumulated a fortune.

Progressive in every way, he owned the first store in the town of Danielsville and was its first postmaster. He was clerk of the court for years and to this day his books, written in a beautiful hand with a quill pen and without blot or erasure, are shown at the courthouse as models in every respect.

He was the leader in all new enterprises and established on one of his plantations the first flour mill in that part of the state. From long distances wheat was sent to his mill to be ground into flour. The writer inherited a dress made of a surplus material called silk bolting, a beautiful transparent cloth ordered to be used in refining the flour. James Long also became a large stockholder, at its inception, of the Georgia Railroad Company, one of the first railroads to be built in the South. For many years it paid no dividends but eventually became very valuable.

James Long founded the academy at Danielsville and was always deeply interested in its welfare. He also endowed the school, but the fund was unfortunately invested and was lost during the Civil War. It was he who engaged the teachers, who were generally from a northern state. The last one he employed was a most cultured woman who later married his business manager and secretary. She died a few years ago cherishing and revering his memory, for it was he who cordially welcomed the young stranger to his home where she was treated with the greatest consideration. James Long was so deeply versed in the law that William H. Craw-

ford and other lawyers frequently consulted him upon legal questions.

For years he represented his county in the Legislature, and his district in the state Senate. In those days politics were at fever heat in Georgia and even socially the line of demarcation was so strong between the Whigs and Democrats that the children of opposite parties refused to play with each other. James Long was an ardent Whig, his brothers Democrats, and as a consequence when he ran for office his brothers voted against him.

James Long was an elder in the Presbyterian church, of exalted faith and uncompromising character; a typical Scotch-Irish Presbyterian elder of the old school who held family prayers and reared his children to recite the shorter catechism from beginning to end without a question being asked. He was tall and grave. I recall him as always clad in black broadcloth with black satin vest and high silk beaver hat, in winter wearing a long, voluminous, black broadcloth cape. He was a dignified figure and I still often wonder if he ever unbent from that dignity and if he was garbed in that manner when he rode over his plantation.

He was fond of reading and had a fine collection of books, among them early editions of Shakespeare. My childhood delight was an illustrated book of plays which had been acted in Covent Garden, London, antedating the War of the Revolution, among them "The Beggar's Opera." Before me lies one of the old books, "A Discourse on Idolatry," by Edward Stillingfleet, chaplain in ordinary to His Majesty, Charles II, in 1673. The *Tattler*, the *Spectator*, Burton's "Anatomy of Melancholy," the *Gentleman's Magazine*, published in London, the *Saturday Evening Post* in newspaper form, and *Godey's Lady's Book* were among the books on his shelves. There must have been lighter literature also as I fell heir to one of Miss Edgeworth's tales, entitled "Rosamond and The Purple Jar," which had belonged to my father when he was a boy.

James Long was an indulgent father and husband. As a master he looked upon his slaves as a sacred trust. He governed them with firmness and kindness. Each family had its own house; one I recall had four rooms and a porch and was occupied by three generations. The oldest did not work but looked after the youngest. One of my greatest pleasures was to be permitted to play with the children at "Granny Lucy's," who on such occasions treated us to ginger cakes and persimmon beer, or molasses candy. When "old Marster" died suddenly of cholera there was mourning in the quarters as well as in the "big house," as the master's home was termed in antebellum days.

James Long's closest friend was William H. Crawford, who was once a candidate for President of the United States and whose intellect and presence were so commanding that when he was minister to France, Napoleon said that Crawford was the only man for whom he felt reverence. James Long named his first child Crawford in honor of this friend and contemporary.

Samuel Long, the father of James, was born in the province of Ulster, Ireland, and there married Ann Williamson. On the same ship with his two brothers, James and Andrew, he sailed for America and settled in the Cumberland Valley near Carlisle, Pennsylvania, where many Scotch-Irish Presbyterians had located.

One hundred and forty years later the writer (who is the great-granddaughter of Samuel Long) met in London a distant kinsman, a King's Counsel and a member of Parliament from Tyrone. As we drank tea on the terrace of the House of Parliament he related many facts concerning the Longs and subsequent correspondence has revealed many of the family traits.

I quote from a letter written by a descendant of Samuel Long's brother who remained in Ireland:

It is well known that the Longs were at the defense of Londonderry. Taking an active and fearless part in the daring deeds of bravery of the

siege, from the closing of the gates to the 18th of December, 1688, by the thirteen apprentice boys of Derry in the face of King James' Army until they were opened on the following 12th of August, 1689. Henry Long was Mayor of Londonderry shortly after the siege. For political reasons the Longs, with others, were dispossessed of their lands, the King giving them to his favorites along with titles of nobility. These newly made lords were generally absentees who spent their time in London and on the Continent. As the years passed the Longs became once more very prosperous as did many others in the province of Ulster. The agent of the absentee landlord called to collect his rent. "On hospitable thoughts intent" a fine dinner was served to which he was invited. At the close of the dinner he arose and said: "You seem to be prosperous in every way and you can afford to have silver on your table (which was rare in those days), your rent will be increased."

The reply was "No! we will go to America." To America they came and the three brothers fought for its independence. Later one brother went west, one remained in Carlisle and Samuel came south. From the diary of an old and famous Presbyterian minister of his day, I learn that Stephen Groves and John McCurdy in company with Samuel Long and others came from Cumberland County, Pennsylvania, and settled in Madison County, Georgia, in 1788.

The company left Pennsylvania early in the autumn of 1787 and expected to reach their destination before December 25, but in Abbeville, South Carolina, they learned that the Creek Indians had made a hostile raid into the white settlements of upper Georgia and fearing to proceed further at that time they rented land near Abbeville, made a crop in 1788 and then in the fall sold their crops and moved on to their final destination.

These pioneers suffered many hardships, living in log cabins until they could erect sawmills and build permanent houses.

They brought with them wheat for planting which they were compelled to take to the older settlements in South Carolina

to be ground into flour until flour mills could be built.

Energy and perseverance conquered all obstacles and in a few years the little colony was comfortably established with good homes, schools and a church whose pulpit was beautifully carved, as among the members was a skilled carver of wood.

The chronicler adds quaintly: "Samuel Long was a peaceable upright man who



CRAWFORD W. LONG, AGED TWENTY-SIX. (FROM A CRAYON PORTRAIT MADE A FEW MONTH AFTER HIS FIRST USE OF ETHER AS AN ANESTHETIC.)

attended to his own business and troubled nobody."

He was one of the founders of the second Presbyterian church built in Georgia and was an elder of it. Old New Hope it is called to this day. He and his wife are buried in its churchyard. As far back as we go we see that Crawford Long's paternal ancestors were men of position: quiet, reserved gentlemen but of forceful character

and intellect, industrious and thrifty. They were interested in public affairs, founding churches and endowing schools.

Crawford Long's mother, Elizabeth Ware, was born in Amherst, Virginia, of English ancestry. Edward Ware, her father, espoused the cause of the colonists and fought in the Revolutionary War, entering the army at the age of sixteen. Sometime after its close he emigrated to Georgia with his family and slaves and made his home on a plantation in Madison County. Among his possessions was a considerable amount of continental money. Believing it would never be redeemed and wishing to keep it as a memento it was used in papering a small room. Later when by act of Congress the paper money became valuable, this was so firmly attached to the wall that its only worth was from association.

The house in which Elizabeth Ware lived as a girl is in good preservation: a two story building, necessarily large, as there were fourteen children. It was the first house in that portion of the state to have glazed windows and was built in the old colonial style.

Elizabeth Ware was a beautiful woman and had many suitors. At the age of twenty-four she married. She was warm-hearted, generous, sympathetic and impulsive. She was by birth and rearing an Episcopalian. It was said by the sober Presbyterians that she was worldly, loving dress and the pomps of life. Her husband, the Presbyterian elder, was grave and dignified, but so just and good a man and neighbor that it lessened the awe one was wont to feel in his presence.

Life in those days was very simple. The Southern planters were hospitable and guests were always heartily welcomed. Visitors frequently remained for months. James Long's home was not far from the Presbyterian church. On Sundays there were often as many as twenty visitors from the surrounding country for dinner. Preparations as far as possible were made on Saturday.

In the home of the Southern planter there was an abundance of all the fruits of

the earth. To have sold fruit, milk and butter, chicken and eggs would have been considered mean. A neighbor who lacked these things was welcome to all he wanted. It is no wonder that we were considered a prodigal, extravagant people. Had we been near the great markets of the world, our lives would probably have been different. Circumstances and environment influenced us greatly. Time with its changes has also changed our mode of living.

The most beautiful devotion existed between James and Elizabeth Long. It was the husband's pleasure to surround his wife with such luxury as was obtainable in those days. For many years before the day of railroads handsome clothing and furniture were brought to her by wagons from Charleston, nearly three hundred miles away. Yet she was no idle butterfly and looked well to the ways of her household.

During her husband's absence, as state senator, or when other business called him from home, the affairs at the homestead and the large plantation were all under her control. No overseer was employed, but the most trusted and faithful of the negro men served as foremen, and to "old miss" they made their reports and from her received their orders.

All cloth used in making garments for the slaves as late as 1854 was spun and woven under her direction on the plantation. A miniature factory with its wheels, carding warehouses, and hand looms was always busy making cotton goods for summer and woolen goods for winter wear. It was she who superintended the making of these goods into clothing. Aside from the women who did the plain sewing there were young women whom she trained to be proficient with the needle. Some of them were even taught to embroider beautifully on linen. These seamstresses, she fondly planned, were to descend to her children and grandchildren, little dreaming that a time would come when there would be no such thing as inheriting slaves.

In sickness it was she who saw that her servants had every attention, so they not only honored but loved her. To James Long and his wife came the neighbors who were destitute and afflicted, knowing they would receive sympathy and relief. They were the leaders in every enterprise for good and although it is sixty years since they passed away, their memories are still loved and honored.

Elizabeth Long was a devoted, conscientious mother, ambitious for her children, yet always instilling into them principles of truth and justice. She was so strict in their manner of expression that they were never known to use a slang phrase. Profanity was forbidden to the slaves.

One can see that in her sphere, which will seem very limited to many, she was in reality a woman of great executive ability. Her fine sense, kindness of heart and dignity of manner gave her an ascendancy among her associates, and inspired the greatest reverence and affection from her children.

After a very happy and prosperous life of more than sixty years, her first deep sorrow came from the death of her brother and her husband from cholera. She nursed them and others unflinchingly until she herself was stricken with the dreadful disease. Although she recovered, her health and former cheerful, brave spirit was broken, and two years later, in 1854, from an apparently slight illness, she died. As children we heard the elders say: "She died of a broken heart, she could not live without her husband."

Crawford Long was born November 1, 1815, in the home to which his mother was carried as a bride. It is a two-story house of eight rooms, the windows having quaint little panes. It is situated on a high hill overlooking the little town of Danielsville, which is today seven miles from a railroad. Once the house had large grounds and a beautiful grove. The colonial porch has been taken away and a veranda substituted. Nothing familiar is left except some fine old oak panelling and two carved mantels.

The negro quarters have fallen down and there is little to remind one of its earlier days.

Crawford Long was a quiet, studious boy. It is said that his father heard him reading the Bible aloud at the age of five. All his life he was a faithful student of the Book and was governed by its precepts. He was a normal boy, loving horses and dogs, swimming, fishing, jumping and all athletic sports. He was a fine shot even during his last days.

When Crawford Long was fourteen years of age he was prepared to enter Franklin College, now the University of Georgia, and allowed to enter so young as a special favor to his father who was an intimate friend of the president, Dr. Alonzo Church.

At this time Alexander H. Stephens was in a more advanced class in the college. For some reason they became roommates in the first building which was erected in Athens and used as a dormitory for the students. It has long been known as "the old college."

As Mr. Stephens was the senior member of the student body and Long the junior they were known as Daddy and "the baby." In later years Daddy (Stephens) became vice-president of what was once the Southern Confederacy, and in his own state was called "The Great Commoner," while "the baby" by many is known as "The Discoverer of Anesthesia."

Through loyalty to his college-mates Crawford Long came near expulsion from college. Having witnessed some prank which his friends had played he was called upon to testify. This he refused to do in spite of persuasion and threats, but it prevented his taking the first honor in his class.

He had a retentive memory and was a good student, and in August, 1835, graduated at the age of nineteen, with the second honor and the degree of A.M. Francis Bartow received the first honor. He became a distinguished lawyer, later a general in the Confederate Army, and was killed at the first battle of Manassas.

The friendship between Alexander H. Stephens and Crawford Long continued through life. Politically they belonged to the same party and held the same views in the fateful years of 1860 and 1861. Both opposed secession yet both deemed it right to throw their fortunes with their state when it separated from the Union. The tie which bound these two Georgians through life still holds them, as Georgia has selected them to represent her in Statuary Hall in the national capitol at Washington.

Some of the most distinguished men of Georgia were contemporaries of Crawford Long at Franklin College. Among them were Howell Cobb, who later became governor, senator and secretary of the treasury during Buchanan's administration, and leaving the arena of politics for the arena of war, was made general in the Confederate Army; Senator Herschel V. Johnson and General Bartow, but his closest friend was Alexander Stephens. Undoubtedly the embryo physician must have received inspiration from association with such men as these.

I fancy that in those days men were more ingenuous than now or that it was the fashion to give vent to sentiment. Every college boy had his album in which undying expressions of friendship were written in a style which now seems quaint and stilted. As an example, I quote these lines from my father's:

H. M. Jackson,
Franklin College,
Athens, July 23, 1825.

Dear Crawford:

If I had ever been your classmate, I should even then have considered it an inestimable privilege to have been counted worthy to sully a pure page in your remembrance book; but with how much warmer feelings do I (being a Junior) hail an opportunity that thus presents itself of subscribing my name in this little repository of your friends.

Crawford! whenever in some future day, you'll be looking through this little book and your eye shall light upon this small token of

friendship, I humbly ask, pass it not by without one kind thought for your sincere friend

Gideon D—

A little more than thirty years later, soon after the close of the war between the States, a dignified man, evidently a gentleman, approached the writer, who was standing on the front veranda of her father's home, and in a courteous manner asked if the mistress of the house wished to buy any brooms, that he was selling them, and as proof had one as a sample. There was such a pathetic dignity about him that the sympathies of the household were aroused. It was hard to realize that a cultured gentleman should be engaged in so lowly a calling as peddling brooms. Inheriting land and slaves, he had lived for fifty years a life of luxury until stripped of them by the misfortunes of war. Bred to no profession and knowing nothing of manual labor, he was glad to do anything to make an honest living. Humiliated and broken by misfortune, he was a tragic figure. His old college friend did not fail to succor him, for although he, too, was in great straits, Gideon D's necessities were greater.

After my father's graduation, August, 1835, he returned to his boyhood home near Danielsville. His father deemed it best on account of his youth that he should remain there a year before studying his chosen profession, medicine. This year was not spent in idleness but in teaching, as principal of the town academy. Some of his pupils were older than he. At the close of the scholastic year, he read medicine with Dr. Grant of Jefferson. Later he spent a year at Lexington, Kentucky, attending the Medical Department of Transylvania University. He made the long and fatiguing trip alone on horseback with his saddle-bag containing such clothing as was necessary for the journey. His route was through the mountains of western North Carolina and East Tennessee. The Indians had not all been removed. The whites were simple, kindly, hospitable people, descendants of Scotch-Irish. In these mountain fastnesses

is to be found the purest Anglo-Saxon blood in America. Many of the old English songs he heard sung in the cabins, and the children were playing the same games that are still common in the rural districts of the mother country. Particularly interesting to him were old words common in Shakespeare's day, for he was a great reader of Shakespeare. One of the words was "holp" as: "He holp me do it." Many others are even now in common usage, but obsolete elsewhere.

After several weeks of climbing mountains, fording streams and following trails through the forests, he reached the fertile fields of Kentucky. In later years he often expressed his admiration of the blue grass region with its fine cattle and horses. Possibly it was this association that made him love blooded horses and enjoy the races at the county fair.

When in Lexington he frequently visited Ashland, the hospitable home of Henry Clay. His father was an ardent supporter of Mr. Clay, which perhaps influenced the latter to treat the young Georgian with special consideration.

It was his desire and his father's determination that he should have the best medical instruction to be obtained in America. In 1838 he went to Philadelphia and entered the Medical Department of the University of Pennsylvania. "Nowhere else could he have found the scientific traditions, the intellectual stimulus to original thought and deed, the 'atmosphere' in other words, that was favorable, probably essential, to his later achievement."

The University of Pennsylvania was first in renown among the twenty-eight medical schools of the country, and possessed the ablest faculty in the United States. The buildings were at Ninth and Chestnut Streets, where the Post Office now stands. On the rolls of the University were 400 medical students, over one-seventh of the entire number in the land.

Philip Syng Physick, the pupil of John Hunter and the father of American surgery,

died during Long's first course. At the time of his death he was emeritus professor of surgery and anatomy. He was the first to use catgut as a ligature material, devised the stomach tube and many useful instruments, and advised the treatment of ununited fracture by the seton.

William Gibson, the pupil of Sir Charles Bell, was the professor of surgery. While traveling in Europe he had been present as a spectator at the battle of Waterloo and been wounded by a stray bullet. He was the friend and correspondent of Lord Byron. In 1819 he was called from the University of Maryland to succeed Physick in Pennsylvania. He was the first man to tie the common iliac artery (1812). He twice did a successful caesarean section on the same patient, and saved the mother and both children. Nathaniel Chapman, the wit, critic, booklover, social light, jovial companion and scientist, was professor of practice of physic and clinical medicine. He stood without a peer as a practitioner and in spite of a congenital speech defect, was one of the greatest teachers in America. Chapman's book on therapeutics was widely celebrated.

George B. Wood, the profound scholar, the keen observer, the original thinker, taught materia medica. With Franklin Bache he edited the United States Dispensary. For many years he practically determined the views of the whole profession on ethics and practice. His lectures were the pride and glory of the university and had immense influence in moulding the minds of the students. No man who has held a chair in the university ever brought greater reputation to it.

William E. Horner, he of the feeble frame, melancholy temperament, scholarly faculty and original bent, was professor of anatomy. He is particularly remembered as the founder of St. Joseph's Hospital and the discoverer of the tensor tarsi, which is still called Horner's muscle. Samuel Jackson, who did so much to introduce the principles of Laënnec and Louis to the American

profession, was professor of institutes of medicine.

Hugh L. Hodge, who had been forced to abandon a surgical career because of impaired sight, was professor of midwifery, having defeated Charles D. Meigs for the chair. Hodge's forceps and pessaries were known all over the world.

Robert Hare was the celebrated professor of chemistry. He had been a fellow-student of Silliman, and when only twenty years of age had invented the oxyhydrogen blowpipe. He was one of the ablest chemists and electricians then living, was a most impressive lecturer and a highly successful experimenter.

Such were the men of the faculty of 1838 and 1839, the men to whom the young Georgia student listened, the men who helped to guide and direct his mind. The session began November 1, according to the catalogue; it ended "about the first day of March ensuing." Commencement was evidently a movable feast, for the catalogue states that it is "held generally about the first of April." No textbooks were recommended in the catalogue, but we know that students used the "Syllabus of Wood's Lectures," Chapman's "Therapeutics," Gibson's "Surgery," Horner's "Anatomy" and Hare's "Chemistry."

Blockley stood where it does now, and some of the buildings are very little changed externally. Agnew says that at this period Blockley was "the great clinical school of the country." Every Saturday morning many busses gathered at Ninth and Chestnut streets, and crowds of students rode out to clinical lessons within those grim walls. Lectures were given by Samuel Jackson, Robley Dunglison, Joseph Pancoast and William W. Gerhard. J. C. DaCosta speaks of Gerhard as "the greatest observer and clinician America has produced." The students also attended the clinics of William Norris, George B. Wood, John Rhea Barton and John K. Mitchell at the Pennsylvania Hospital.

Dr. Dudley Buxton of London states that during the first half of the nineteenth

century, there was an odd class of persons who wandered about the country, both in England and in the United States, lecturing in public on chemistry. During the course of the lecture it was the custom to invite persons from the audiences upon the stage to inhale nitrous oxide or ether vapor for the purpose of provoking exhilaration, excitement and mirth-provoking antics. This first began with the use of nitrous oxide, but soon ether became the favorite, for the reason that it was more easily manipulated.

Some of the Georgia medical students boarded with two Quaker maiden ladies at the corner of Nineteenth and Market Streets. After attending one of these lectures they locked themselves in a bedroom and tried the effects of ether for the purpose of exhilaration, and not from any scientific motive.

Later, about 1840, these wandering lecturers came south, using nitrous oxide or "laughing gas" as it was called, arousing not only merriment but the wonder of their audiences, and in November or December, 1841, Crawford Long introduced the use of ether as an exhilarant in the little town of Jefferson, where he had located the preceding August.

After his graduation in medicine in 1839, he went to New York to perfect himself further and spent eighteen months "walking the hospitals," specializing in surgery and witnessing much suffering. He attained such a reputation for skillful surgery that he was advised to go into the Navy. Yielding to his father's wishes he decided to return to Georgia.

While in New York he had the opportunity to hear Valentine Mott, Kearney Rogers and Willard Parker. He had obtained the best medical training and felt qualified to begin practice in a large city, preferably Philadelphia, but from filial duty he located in the small town of Jefferson, Jackson County, buying the business of his old preceptor, Dr. Grant, who later became one of the distinguished physicians of Memphis.

The contrast was great between the busy life of the two largest cities in the United States, Philadelphia and New York, and the small village of a few hundred inhabitants surrounded by plantations of slaves, the planters' families being practically the only white people living in the country. This little town he considered only as a temporary home until a better opening in the South could be found. Mean while he pursued his studies. In an old journal written by his wife, then only sixteen years of age, she writes rather pathetically: "The doctor is so absorbed in his professional duties and his books that I see but little of him."

Jefferson was 140 miles from a railroad. Much of the time in winter the dirt roads were impassable for vehicles, swamps were undrained and streams were forded. A journey of twenty miles was often an all day expedition full of thrills and dangers.

In 1839 there was published in New York, by one of the most reputable houses of that day, a periodical known as *Chapin's United States Gazetteer* in which there were a number of interesting facts relative to Georgia, among them the following:

"The population was 516,823 of whom 217,530, nearly half, were slaves. The chief towns were Savannah, Augusta and Milledgeville." Then follows a description of the topography of the state and its various products. Mention is made of the gold mining in the Blue Ridge. It continues: "Until recently a large portion of the state was occupied by the Cherokee Indians and the western part by the Creeks who have been recently removed to the lands assigned them by the United States west of Arkansas."

Among the railroads mentioned was the Augusta and Athens, fourteen miles in length, which for many years was the only railroad outlet for northeast Georgia.

The population of the city of Augusta, white and colored, was 6690; that of Milledgeville, the state capitol, 1559, and of Savannah, the largest city in Georgia, less

than eight thousand. Knowing these facts, is it any wonder that news travelled at a snail's pace? As late as 1857 a trip from Athens, Georgia, to New York City, now made in twenty-four hours, required almost a week of intermittent travel. The first day one leisurely journeyed to Augusta (120 miles distant) where the night was spent unless one was reckless enough to travel at night. From a letter dated Baltimore, September 13, 1857, I quote a recital of the delays experienced by my father on such a trip.

You will see from the heading of my letter that I have met with my usual luck and am again detained in this city for a day. This has happened to me for the three last times I have started to New York. We arrived this morning at nine o'clock and will remain until some time tonight. We missed connection at Weldon which threw us about twelve hours behind time and this detention here will make us about twenty-four to thirty hours later getting to Philadelphia than expected. We will however reach Philadelphia tomorrow in time to transact some business, if we meet with no accident.

At Augusta we were advised to make the route through Columbia, S. C. and strike the Wilmington line at Weldon, N. C. The Wilmington and Manchester line, the one I have usually traveled, passes through a very swampy country, and for miles over trestles and bridges, on which several accidents have occurred lately. A detention of one night in the swamps is almost certain to produce fever.

Although well I am very much fatigued. During the described trip there was a delay of a day in Columbia which gave me an opportunity to visit the college with its handsome campus. Returning to the hotel I formed the acquaintance of an agreeable gentleman who proposed going with me to see the garden of Mrs. Wade Hampton which he informed me was the greatest attraction in Columbia.

In that day in the South both vegetable and flower gardens were presided over by the mistresses of the homes, many of whom were fine botanists and had wonderful collections of flowers. Friends exchanged seeds, slips and rooted cuttings and a

pretty custom of naming a rooted rose for the giver existed. Matrons and maids were wise in garden-lore, proficient in budding and grafting, and supervised the trimming of hedges and the shaping of evergreens into various forms.

The colored gardeners under their tutelage became wonderfully expert. The following paragraph explains why this garden was designated as Mrs. Wade Hampton's garden.

I accompanied him and was delighted with my visit. Of all the private or public gardens I have seen, I have never seen one which would compare with it for beauty. It is large, comprising a number of acres, and has every variety of evergreens and hot house plants. The most beautiful thing in the hot house is a tropical vine in full bloom with the most beautiful flowers I have ever seen. Near it is the orange, the lemon, and the banana in bloom, the flowers of each beautiful but they do not compare with this vine. I have not time to give you any idea of the great variety of flowers in the hot house, but beautiful as they are I was more interested in the garden which is filled with evergreens.

Of one of the avenues he writes:

It presents the appearance of a green wall about fifteen feet in height, either side of the walk, and trimmed to wall-like dimensions. At the ends of the walk mentioned are summer houses. One of these is built of shells of every color, size and variety, the ceiling made of the handsomest. It is impossible to describe it to you. The other made of sticks, and mosses which is very handsome. A number of other summer houses are in the garden. I think my visit will be of benefit to me.

I have learned something of the trimming of the Osage or wild orange which will be useful.

Now my dear wife, I must bid you good-bye. A few moments more and I will be on my way farther from home and from you, how long the time will seem when absent from you and the dear children.

Before writing of the beginning of my father's medical career, it may be of interest to know that he performed his first surgical operation at the early age of five years,

chopping off three of his sister's fingers. The two were playing a game in which she snatched her hand from a block before his hatchet could descend upon it. But for some childish reason she did not withdraw her hand the last time with the result that her fingers were almost severed from her hand. The little boy, greatly distressed at this tragic occurrence, persistently held the fingers in place until his mother could reach the scene. It was she who united the soft tissues that remained by the application of sugar, bandaged and saved the fingers, though they were scarred for life. Twenty years later he performed another operation not as the first, by accident, but with purpose, to decree the death of Pain.

At the time he located in Jefferson to begin his chosen profession of medicine, he was nearly twenty-six years of age. Although a young man, he soon acquired a practice which extended for miles into the country. In order to reach his patients, dangerous streams had to be forded and long drives taken over rough and lonely roads. At night he rode his favorite horse, Charley, a large grey which, on account of his sagacity and surefootedness, was invaluable to him. Once called to make a visit many miles distant on a stormy, pitch-black night, he, as was often his custom, gave Charley the reins. When he arrived at a bridge over a river it was with difficulty that the horse could be persuaded to cross it, but with slow and hesitating steps he finally did. His master spoke of this after reaching his destination, and realized the danger he had been in when he was told he had crossed on a narrow foot bridge, which was a partial substitute until a new one could be built to replace the old which had been torn away. He endured all the hardships that fell to the lot of a country doctor.

Although a small town, Jefferson had a number of young men of refinement and culture who were interested in the affairs of the great outside world as communicated in their infrequent newspapers and

magazines. Dr. Long's office became the rendezvous for these. Sometimes they played games of old-fashioned whist or checkers, again they discussed the writers of the day. Dickens delighted them with a new phase of the novel. His stories clutched their hearts as well as the hearts of humanity, and they enjoyed his new kind of humor. They were enthralled by the adventures of Mr. Pickwick and his friends, with Nicholas Nickleby and Oliver Twist. My father



STAIRWAY ENTERING THE BUILDING IN WHICH THE TWO OPERATIONS ON VENABLE WERE PERFORMED. TO THE LEFT ON THE GROUND FLOOR WAS DR. LONG'S OFFICE, IN THE REAR HIS DRUG SHOP.

kept his old copies of these stories with the wonderful illustrations of Cruikshank. No one who has seen them can forget "Oliver asking for more," "The Beadle's courtship," "Fagin and the Artful Dodger," "Bill Sykes and poor, ill-fated Nancy." Washington Irving's "Sketch Book" was a favorite also and Longfellow's ballads enchanted them. The world was full of ferment, investigation, speculation and novel ideas. These they pondered over, accepting this, dismissing that, interested in all.

On one occasion some visitors importuned my father to let them inhale nitrous oxide gas as they had heard of its exhilarating effects. The wandering lecturers on chemistry had journeyed to the larger towns in the South and were arousing the wonder of the people at their fantastic exhibitions. Having no nitrous oxide gas he provided a substitute, but let him give in his own words the events of that memorable evening:

In the month of December, 1841, or in January, 1842, the subject of inhalation of nitrous oxide gas was introduced in a company of young men in this village; several persons present desired me to produce some for their use. I informed them that I had no apparatus for preparing or preserving the gas, but that I had a medicine (sulphuric ether) which would produce equally exhilarating effects: that I had inhaled it myself, and considered it as safe as the nitrous oxide gas. One of the company stated that he had inhaled ether while at school, and was then willing to inhale it. The company were all anxious to witness its effects. The ether was introduced. I gave it first to the gentleman who had previously inhaled it, then inhaled it myself, and afterwards gave it to all persons present. They were so much pleased with the exhilarating effects of ether, that they afterwards inhaled it frequently and induced others to do so, and its inhalation now became fashionable in this country, and, in fact, extended from this place through several counties in this part of Georgia.

We may note that R. H. Goodman, one of the persons who participated in an ether frolic in Jefferson, made an affidavit in 1853, stating this fact and also that he removed to Athens, January 20, 1842, and introduced ether frolics in that community. It is interesting to observe that Long had inhaled ether before the first ether frolic, and that, repudiating the teaching he had received as a student, he regarded it as being as safe as nitrous oxide. To continue Dr. Long's narrative:

On numerous occasions I have inhaled ether for its exhilarating properties, and would frequently, at some short time subsequent to its

inhalation, discover bruises or painful spots on my person, which I had received while under the influence of ether. I noticed my friends, while etherized, received falls and bangs, which I believed were sufficient to produce pain on a person not in a state of anesthesia, and on questioning them, they uniformly assured me that they did not feel the least pain from these accidents. These facts are mentioned that the reasons may be apparent why I was induced to make an experiment in etherization.

The first patient to whom I administered ether in a surgical operation was Mr. James M. Venable, who then resided within two miles of Jefferson, and at present (1849) lives in Cobb County, Georgia. Mr. Venable consulted me on several occasions in regard to the propriety of removing two small tumors situated on the back of his neck, but would postpone, from time to time, having the operations performed, from dread of pain. At length, I mentioned to him the fact of my receiving bruises while under the influence of the vapour of ether, without suffering, and as I knew him to be fond of and accustomed to inhale ether, I suggested to him the probability that the operations might be performed without pain, and proposed operating on him while under its influence. He consented to have one tumor removed, and the operation was performed the same evening. The ether was given to Mr. Venable on a towel, and when fully under its influence, I extirpated the tumor. It was encysted and about one-half inch in diameter. The patient continued to inhale ether during the time of operation, and when informed it was over, seemed incredulous, until the tumor was shown him. He gave no evidence of suffering during the operation, and assured me after it was over that he did not experience the slightest degree of pain from its performance. This operation was performed on March 30, 1842.

It is only the old, old story of genius groping in the dark. Tyndall says: "The greatest discoveries of Science have been made when man has left the region of the seen and known and followed the imagination by new paths to regions before unknown."

Long found the practice of ether inhalation an amusement, but owing to his keen-

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ness of observation and reflective turn of mind he left it the anodyne to hush "Life's saddest voice, the birthright wail of pain." Shortly before his death a member of his family inquired, "Were you not afraid to make a man unconscious?" He replied:

No! I had seen my friends receive falls and blows and one man so badly lamed as to be unable to walk, yet all were unconscious of pain when the hurts were received so that I knew it was from the effects of the ether inhaled. When giving it to Venable, with one hand I held the towel over his mouth and nose permitting him to breathe a little air as he inhaled the drug; my other hand I kept upon his pulse. When he became insensible to the prick of a pin I operated. As an inducement to Venable to allow himself to be the subject of such experiment, my charge for the operation was merely nominal, \$2.00, Ether, 25 cents.

Many years later (1912) an eloquent speaker, J. Chalmers DaCosta, said:

When Long finished that operation he must have felt a sense of combined wonder, exultation and responsibility. It was a brave thing to operate under the full influence of a drug when all professional teaching was that it required large amounts of the vapour to produce unconsciousness, and that large amounts were dangerous. Had the patient died, the doctor would have had a lifelong self-reproach and would possibly have been sued or prosecuted for manslaughter. It was brave of Venable to take the chance. Wonder would naturally arise in Long's mind as he thought of the agonies inflicted by the surgery he had seen in Philadelphia and New York, as compared with the perfect tranquillity of the patient just operated upon. Exultation would be inseparable from the accomplishment of what the masters of surgery regarded as impossible. A sense of grave responsibility would rest in a man who believed he had done a mighty thing, but felt the necessity of proving it thoroughly in order that he might not mislead others and do harm.

There were only four witnesses to this, his first operation, which was performed in the doctor's office: James E. Hayes, Edmund S. Rawls and A. T. Thurmond, classmates of Venable, and W. H. Thur-

mond, principal of the academy. Some years ago, in some inexplicable manner, a story became current that the operation occurred under the shade of a large mulberry tree standing in front of the office, in the presence of many witnesses. A little reflection would show the absurdity of a reputable physician trying an experiment in surgery in the open air on a windy March day under the shade of a tree. At that season of the year a mulberry is not in foliage. In truth, the tree was not planted until after Dr. Long's marriage.

He was considered reckless, perhaps mad. It was rumored throughout the country that he had a strange medicine by which he could put people to sleep and carve them to pieces without their knowledge. His friends pleaded with him to abandon its use as in case of a fatality he would be mobbed or, in present-day parlance, lynched. The author knows of but one person who encouraged him by absolute faith, a girl of sixteen to whom he was engaged and who eventually became his wife.

Although quiet and reserved the young doctor had a deep vein of sentiment, as was proved by his first and only love affair. After his graduation at Philadelphia during a brief visit to Jefferson he chanced to observe a graceful child of fourteen on the street and so impressed was he by her appearance he contrived to obtain a closer view of her. Her brilliant complexion, sparkling eyes, golden hair and vivacious manner captured his fancy completely and although ten years her senior he resolved then and there that he would marry her as soon as she should reach the marriageable age, which in that day was sweet sixteen.

Caroline Swain, as the child was named, was the daughter of a planter, George Swain, a brother of the governor of North Carolina and later president of the state university. Her paternal grandmother was Caroline Lane, many of whose male descendants have been senators, governors and judges, while many of the females have evinced poetic ability. This talent

Caroline Swain sometimes cultivated but her forte was letter writing. She was an enthusiastic lover of Nature.

Many years before the "Land of the Sky" became a summer resort she was in the habit of spending the month of August in what was at that time the secluded little village of Franklin, 120 miles distant from a railroad, but boasting of college graduates and people of culture and refinement. Her account of a summer outing in this village displays a charming native sensibility.

From the time of her marriage she kept intermittently a diary. Of the early years of her married life she thus expresses herself:

Yes, we had an earthly paradise—that of perfect love and harmony. Never did a palatial home contain a happier couple than ours beneath the locust trees whose fragrant flowers hung pendant above the shady green lawn, the latticed porch a bower of beauty, covered with pink multiflora roses, flowers on the window sills, humming birds darting out and in the open windows, where I so often sat with a book or some light sewing, watching for a "solitary horseman." For his dear presence, loving words, fun and frolic, I lived. The laborious life of a village doctor with an extensive practice in the adjoining country and villages and towns, without railroads, is hard to conceive now. To reach his patients, swollen streams had to be crossed at the fords amid dangers, winter's cold and summer's heat disregarded, with loss of sleep and exhaustion the consequence.

But returning to my pleasant window, I yet see him dressed in a light blue summer suit, collar and cuffs black, tan-colored gloves, wide-brimmed white hat, sitting superbly on his dapple grey charger, firm, dignified—he rides like one to command.

During these earlier years of his practice the doctor was growing mentally in his chosen profession. His practice, already large, was extending; his fame as a surgeon acknowledged by the most eminent practitioners of that day; they often sending for him long distances to assist in difficult operations. His hands were remarkably supple and shapely in appearance, their extreme sensibility to touch being of great advantage in certain kinds of practice. His ideals were noble

and lofty, causing aspirations to make the most of himself for the good of mankind. For this he loved, labored and suffered.

Later she writes:

Just at this time the striving village doctor was on the eve of a great discovery, successful anaesthesia in surgery. It occupied his mind so much that he took time to write for publication in 1849 his experiments in the use of sulphuric ether in surgery. He used this method whenever he could induce his patients to submit to the "dangerous drug."

Unfortunately my father had not only to contend against the fears of the people, who had become very much excited over the powers of ether, but also the fact there were but few subjects to experiment upon. Accidents requiring the use of the surgeon's knife were rare in that neighborhood in those days. There was no machinery to mangle people except the cotton gin, and no other source of accident except runaway horses.

Mesmerism at that time was attracting the attention not only of the unlearned and credulous but of the scientific men of the day. Lecturers on mesmerism were exhibiting their powers in the South and people were investigating it in the small towns, and even in the country. It was difficult to persuade the people who knew of my father's operations that the inhalation of a drug could produce insensibility to pain: that this unconsciousness must be from the mesmeric powers of the young surgeon, they could believe.

Dudley Buxton of London said:

Many leading men in medicine and surgery accepted mesmerism as the long hoped for panacea whereby suffering humanity would pass unflinchingly through the ordeals of the surgeon's knife. In France, Richard had tried and pronounced its value and other surgeons scarcely less eminent were willing to swallow the doubtful reputation of Anton Mesmer, so long as they could benefit their patients by employing methods which had been exploited by his fertile brain.

In 1841, Braid of Manchester, England, made his trial of the "neurohypnotic trance." Elliotson of London was also giving the full weight of his great mental powers to mesmerism and in 1843 published his book on "Numerous Cases of Surgical Operations without Pain in the Mesmeric State." Elliotson's skill as a physician and surgeon was generally recognized. Thackeray paid tribute to him in the dedication to "Pendennis."

Another noted surgeon, Topham of London, in 1843 amputated a thigh under the mesmeric influence, and in Paris Jules Cloquet had excised a cancerous breast. In the United States many of the most eminent medical men were using it in surgery, among them Dr. J. K. Mitchell of the Jefferson Medical College of Philadelphia.

The distinguished surgeon, Dr. Gibbes of South Carolina, performed several major operations on mesmerized patients. Nearer home Dr. Long's friend, Dr. L. A. Dugas of Augusta, Georgia, a much older and more experienced physician than he, in 1845 extirpated the breast of a woman in the mesmeric sleep, and in November of the same year, this operation was performed by him upon another woman placed under the same influence, with no evidence of either being sensible to pain.

The editors of the *New Orleans Medical and Surgical Journal* were advocates of mesmerism and as late as 1846 wrote:

That the leading surgeons of Boston could be captivated by such an invention as this under such auspices and upon such evidences of utility and safety as are presented by Dr. Bigelow excites our amazement. Why mesmerism, which is repudiated by the savants of Boston, has done a thousand times greater wonders and without any of the dangers here threatened. What shall we see next?

We must conclude that mesmerism was widely accepted and frequently used during surgical operations; and further, that any fresh departure in the direction of promot-

ing painless surgery was open to the most embittered criticism.

My father read both British and American medical journals and was familiar with all the new discoveries. In his paper concerning his discovery, read in 1849 at the first meeting of the Medical Society of Georgia, he says:

At the time I was experimenting with ether there were physicians high in authority and of justly distinguished character, who were the advocates of mesmerism, and recommended the induction of the mesmeric state as adequate to prevent pain in surgical operations. Notwithstanding thus sanctioned, I was an unbeliever in the science and of the opinion that if the mesmeric state could be produced at all it was only on those of "strong imagination and weak minds" and was to be ascribed solely to the workings of the patients' imaginations. Entertaining this opinion, I was the more particular in my experiments in etherization.

This statement was confirmed by Dr. John F. Groves, my father's first medical student, in reply to a letter written sixteen years after my father's death.

Cohutta, Ga., Dec. 13, 1894.

Mrs. Frances Long Taylor:
Dear Madam:

In 1844, soon after I attained my majority, I decided to adopt medicine as my profession and began to think where and under whom I should begin the preparatory study. My father asked me to choose from among the number of physicians I knew the one I preferred to act as preceptor to me. Knowing Dr. Long so well and believing him to be a man of no ordinary ability, I at once fixed upon him as my choice. I entered Dr. Long's office in May, 1844, as the first student ever under his care. As I progressed with my studies he saw fit to make known to me his discovery by the use of which he could perform surgical operations without giving any pain to his patient. [Here follows a description of the first cases, but as he was not a witness to these, I do not quote him.]

Not satisfied, however, that there was not more to learn about this great discovery, he proposed that we test it further, personally, which we did in his office, where with closed doors we administered it to each other to prove

its perfect anaesthetic effect, also to discover any bad effect to the subject etherized. Owing to the prejudice and ignorance of the populace, Dr. Long was prevented from using ether in as many cases as he might have. Thus in the two years preceding my entering Dr. Long's office he had only about six cases in which to try the anesthetic effects of ether.

The first case that came under his care where its use was applicable after my going into his office was not until January 8, 1845, which was the case of a negro boy having two fingers to amputate, caused by neglected burn. I, as the only student still with the doctor, he had me to accompany him to see the operation and assist in the administration of the ether. The first finger was removed without pain, the second without ether, the child suffered extremely. This was done to prove that insensibility to pain was due to the agent used.

Soon after this in January, Dr. J. D. Long [a cousin] came into the office as a fellow student; later toward spring came P. A. Wilhite and in August came Dr. Long's brother, H. R. J. Long. We four remained there at Dr. Long's office as students until the opening of the fall term of the medical colleges.

(Signed) J. F. Groves, M.D.

Sworn and subscribed to and before me, Dec. 15, 1894.

Wm. H. Wilson, N.P.

In a letter written to Dr. Hugh H. Young of Baltimore, January 15, 1897, describing the operation performed upon the negro boy, Dr. Groves says the patient was placed in a recumbent position, on a bed, with the hand to be operated on to the front for convenience to the surgeon.

Dr. Long poured ether on a towel and held it to the patient's nose and mouth too, to get the benefit of inhalation from both sources. Dr. Long determined when the patient was sufficiently etherized to begin the operation by pinching or pricking him with a pin. Believing that no harm would come of its use for a reasonable length of time he profoundly anesthetized the patient, then gave me the towel and I kept up the influence by holding it still to the patient's nose. The patient was entirely unconscious—no struggling—patient passive in the hands of the operator. After a lapse of fifty

years you would hardly suppose that a man could remember every minute detail but I have clearly in mind all the facts I have given you.

Your obedient servant,
J. F. Groves, M.D.

Dr. Young arrives at this conclusion:

Long then administered ether as it is done today (Nov., 1896). He did not pause at the threshold of discovery or topple the other way, but kept ahead and by careful observation, experimentation and reflection discovered that ether was a safe, sure and complete anesthetic.

Nor did his patients etherize themselves and at the same time superintend the operation as Morton would have us believe.

The following affidavit from John G. Lindsey proves the contrary:

GEORGIA, JACKSON COUNTY.

Personally appeared before me, John G. Lindsey who being duly sworn deposeth and saith that he was a classmate of James M. Venable in the Academy at Jefferson in Jackson county, Georgia in the year 1842, then in charge of William H. Thurmond, Esq., and at some time during that year there was a surgical operation performed on James M. Venable by Dr. C. W. Long while as he (the said J. M. Venable) has repeatedly told me he was under the influence of sulphuric ether administered to him by the said Dr. Long. I recollect to have heard him (Venable) say often in conversation with others that the operation was performed without pain whatever. The operation was cutting a tumour or wen from the back of the said Venable's neck. As to the year above given I know I cannot be mistaken as it was the only year Mr. Thurmond ever had charge of the Academy at Jefferson. Sworn to and subscribed before me the 12th day of December, 1893. James H. Hayes, J. P.

John G. Lindsey.

Soon after my father's death I learned that one of the witnesses to the first operation on Venable was living and I desired to know if anything more on that subject could be obtained from him than was given in his affidavit dated August 4, 1849, and requested him to answer certain questions.

Marion, Perry Co., Ala.,
June 3, 1880.

Miss Fannie Long.

Your letter dated May 1, 1880 has just come to hand. I assure you that I have never received a letter from your father or anyone else relative to the subject you mention except about 1850. I received a letter and some interrogatories which I filled to the best of my memory. In my native village, Jefferson, Jackson County, Georgia, it was a very common thing (in the year 1842 I was about sixteen years old) for a parcel of us town youngsters to meet together and take or inhale ether for sport. We bought what the druggist labeled sulphuric ether. Sometimes your father, Dr. C. W. Long, would be with us. Occasionally some of us would get very much bruised but experienced no pain until after we recovered from the influence of the ether. Dr. Long frequently made expressions relative to the effects of ether on the system, he said that surgical operations could be performed without pain if enough ether would be used.

The doctor at that time was medicating a tumor on the neck of James M. Venable. He told Mr. Venable that he could cut out the tumor and that he (Venable) would suffer no pain. A few days after said conversation I accompanied Mr. Venable to Dr. Long's office. Dr. Long gave Venable some ether on a folded towel and Dr. Long cut out the tumor. Mr. Venable said that he experienced no pain in the least. Mr. Venable and I were intimate friends and school mates at the time the above took place. You ask me what suggested the idea to his mind? He saw us get hurt while under the influence of ether. In other words he saw the apple fall, like Sir Isaac Newton he gave it his attention. You ask was his determination sudden. So far as I know it was, for soon after we began to use ether for sport he proposed to operate on Mr. Venable.

Your third question is: "Did he receive encouragement from any one?" Not that I know of.

Your fourth question, "Was it the deliberate conviction of his own mind?" In expression of ideas he made no quotations.

"Had we ever heard of any one being made insensible by the inhalation of ether before this time?" I had used it and saw a great many others use it as I have stated, but never saw it

used for any other purpose than sport and amusement until I saw Mr. Venable take or inhale it. At that time Mr. Venable and I were going to a literary school. I did not go into any office to read medicine until the year 1853.

I will take pleasure in answering any questions or give any information in my power. I expect I am the only living witness to the operation performed on Mr. Venable by your father.

Most Respectfully,

E. S. Rawls.

You are at liberty to use this in any way you may see proper.

In October, 1905, a venerable man bowed with the weight of more than four score years, called upon the writer and, giving his name as Robert Goodman of Atlanta, stated that he had in his possession a letter written by my father, ordering the ether used in his operation on Venable in 1842. This important missive had followed Mr. Goodman's fortunes across the continent twice, hidden away in an old trunk, for nearly sixty years. Reduced to poverty by the war of the sixties, Goodman moved to Oregon with the hope of rebuilding his fortunes. Disappointed in this he returned to Atlanta, Georgia, where he had been for many years a successful and respected citizen.

A member of his family investigating the contents of the trunk found the letter which he felt impelled to give me personally. This letter, folded to form its own envelope as was the custom of those days and sealed with wax, was unstamped but marked "postage 25 cents."

Jefferson, Feb. 1, 1842.

Dear Bob:

I am under the necessity of troubling you a little. I am entirely out of ether and wish some by tomorrow night if it is possible to receive it by that time. We have some girls in Jefferson who are anxious to see it taken, and you know nothing would afford me more pleasure than to take it in their presence and to get a few sweet kisses(?). You will please hand the order below to Dr. Reese, and if you can meet with an opportunity to send the medicines to me tomorrow

you will confer a great favor by doing so. If you cannot send them tomorrow, get Dr. Resse to send them by the stage on Wednesday. I can perhaps persuade the girls to remain until Wednesday night but would prefer receiving the ether sooner.

Your friend.
C. W. Long.

On the outside is stated:

This letter written to me by Dr. C. W. Long in which he ordered the ether with which he performed the first surgical operation on a patient under the influence of that drug. A wen removed from the neck of a young man, Mr. James Venable, without giving him any pain, it was a complete success.

In November, 1841, Dr. C. W. Long told me he believed an operation could be performed without the patient feeling pain by giving him ether to inhale. In April, 1842 he told me his experiment on James Venable was successful. I also saw James Venable the same spring who told me that he felt no pain during the operation.

R. H. Goodman.

That my father was fond of a joke is evident from his reference to his "kissing the girls." At an entertainment during Christmas he was prevailed upon to inhale ether to demonstrate its exhilarating effects. A spirit of mischief suddenly possessed him and he told those present that they must not be surprised at anything he might do. They assured him that no offence would be taken as he was kind enough to yield to their solicitations. He became slightly under the influence and proceeded with the utmost gravity to kiss every girl present. So great was his dignity and modesty which he retained through life that his prank was not suspected. In later years he was wont to relate with gusto: "The girls could not have been very averse as he was so often importuned afterwards to reveal to them the effects of the mysterious drug." But this boyish prank was never repeated. He initiated them into the mystery and left them to their amusement. To him it was a serious matter, a problem to be solved.

An affidavit from Goodman in 1849 follows:

I certify that on the first of January, 1842, I resided in Jefferson, Jackson County, Ga., and that about that time myself, with several other young men were in the habit of meeting at Dr. C. W. Long's shop, and other rooms in the village and inhaling ether which he administered to us. We took it for its exhilarating effects. On the 20th of January of the same year I removed to Athens in the above named state where I introduced the inhalation of ether.

I and several of my young associates frequently assembled ourselves together and took it for the excitement it produced. After that I know it became very common to inhale ether in Athens, and that it was taken by a great many persons in the place and was frequently taken on the College Campus and in the streets.

R. H. Goodman.
of the firm of
Mathews, Goodman & Co.

August 4, 1849

The affidavits of Drs. Carlton and Camak of Athens show that Dr. Richard D. Moore, who was their medical preceptor in 1843, knew of my father's discovery. Dr. Ange De La Perrière (an exiled French nobleman and a cousin of Count De Trobriand, later General De Trobriand of the United States Army during the Civil War and in the reconstruction period commander at New Orleans) who lived near Jefferson refused to investigate the matter. Later, however, he became one of my father's warmest friends and advocates. He stated in his affidavit: "I do further certify that the fact of Dr. C. W. Long using ether to prevent pain in surgical operations was frequently spoken of and notorious in the county of Jackson, Georgia, in the year 1842."

To my father's disappointment, the older medical men of the vicinity and neighboring towns were sceptical of his claims, all the while expecting a fatal result from some one of his experiments. A young physician, Dr. Joseph B. Carlton of Athens, whose

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wife's family lived near Jefferson and whom the young couple were visiting in the winter of 1844, was influenced by my father to use ether in extracting a tooth. Mrs. Carlton many years later gave the following testimony:

I do certify that Dr. Crawford W. Long of Jefferson, Jackson County, Georgia, advised my husband, Dr. Joseph B. Carlton, a resident of Athens, Georgia, to try sulphuric ether as an anaesthetic in his practice.

In November or December, 1844, in Jefferson, Georgia, while on a visit to that place and in the office of Dr. Long my husband extracted a tooth from a boy under the influence by inhalation of sulphuric ether, without pain, the boy not knowing when it was done.

I further certify that the fact of Dr. Long's using sulphuric ether by inhalation to prevent pain was frequently spoken of in the county of Jackson at this time and was quite notorious.

Mrs. Emma W. Carlton.

Sworn to and subscribed before

Frank Betts,

F. T. Allgood, N.P. Clarke County, Ga., June 29, 1907.

That the Venable operation and others performed by my father were well known in Athens is mentioned by Bill Arp (Colonel William Smith) who said: "When I was a student in college at Athens, Georgia, in 1845, the wonderful discovery of Dr. Long and his use of anaesthesia was the talk of the town and our professor of chemistry, Dr. Le Conte made it the subject of a lecture." Later Dr. John Le Conte and his brother, Dr. Joseph, left Athens and accepted professorships at the University of California. They were both noted in this country and abroad for their scientific attainments and were ardent supporters of my father's claim.

In spite of discouragements my father's confidence in the knowledge that he had found the antidote for pain never faltered and whenever its use was applicable he tried its efficacy. I have in my possession testimony of eight cases successfully anesthetized before September, 1846.

The question has frequently been asked by those who have not investigated the conditions of the times why he did not publish this discovery to the world. Dr. Dudley Buxton of London remarks:

The simplest justice however must explain Long's reticence in a sense which redounds wholly to his credit. Long believed in his method but recognized it needed careful working out; he patiently experimented when patients seemed suitable; when they were not available he tried it on himself and on his pupils. He knew the people were in favor of mesmerism, a system which he regarded with disfavor, and he had no surgeon in his neighborhood to whom he could apply for extended experience. The doctors who were cognizant of his efforts were adverse to them, and so he preferred to wait and to gain experience before attempting to exploit a discovery which might have less in it than appeared at first. He was alive to the fact that some might believe they found in his practice a development of hypnotism.

The following refers to the influence of Dr. Long's old preceptor, George B. Wood:

The profound scholar, keen observer and original thinker, for many years practically determined the views of the whole profession on ethics and practice. His condemnation of the premature reporting of cases and drug actions may well have decided his old student (he had an immense influence in moulding the minds of his students) to delay publishing a report of the actions of ether. Wood spoke of immature views and premature judgments as *ignes fatui*. He insisted that observers must never be content with a single experiment. Dr. Long made no concealment of his discovery, applied for no patent and gave openly and freely to the profession the knowledge of the greatest boon to suffering mankind. [J. Chalmers DaCosta.]

Has Dr. Jenner been criticized or condemned for using vaccine for twenty years before publishing the fact? Later when Dr. Ehrlich, in a new preparation of arsenic, treated seven thousand cases successfully and was asked when he would give his formula to the world, he replied: "Not until I have received reports of twenty or thirty thousand injections."

In a matter so important as anesthesia, with the danger attendant upon its use, a reasonable time should have been allowed for experiments before publishing results. At such a time as a physician is assured by exhaustive demonstration of the safety with which less experienced operators may employ it, and not until that time, should he give it to the profession as a whole.

Dr. Morton did not publish the fact that he had used ether in extracting a tooth. In one of his earlier statements he says that Dr. Bigelow, learning of the incident, was much interested and called upon him several times and requested that he should be allowed to demonstrate it in a surgical operation. On October 16, 1846, Doctors Warren Hayward and Bigelow operated upon a young man at the Massachusetts General Hospital. Morton administered the letheon.

In the words of Dr. Oliver Wendell Holmes: "It was formally introduced to the scientific world in a paper read before the American Academy of Science and Arts, by Dr. Henry Bigelow, one of the first if not the first of American surgeons."

If to promulgate an idea is a greater achievement than to originate an idea, then the title of discoverer of anesthesia should be given to Bigelow, as the operation was performed at his solicitation and published by him.

The four pupils of the youthful country doctor left Jefferson in the autumn of 1845 for various medical schools. His brother, H. R. J. Long, who was then twenty-two years of age, attended lectures in New York City. From his elder brother, he received this letter of advice. Many years later the daughter of the recipient gave it to me.

Jefferson, Ga., December 23, 1845.

Dear Brother:

I suspect you have decided before this time about taking the dissecting ticket. If you have not, I think it will be best for you to defer it, until attending the next course of lectures.

The dissecting rooms in most medical colleges are kept open from the first of October, and

during that month is the best time for dissecting. Then the students can dissect by daylight and when the regular lectures commence they will be through with dissections and have nothing to interrupt their studies. If you have not taken any private lecture tickets, I would advise you not to take any this winter. You are not sufficiently advanced to be profited by them and I have some doubt whether they are of much advantage, even to second course students. The six lectures of the faculty are sufficient for any one to recollect and well digest in the mind in one day. The examinations by the demonstrator in anatomy and by others are no doubt of advantage to those who expect to apply for graduation.

I have never experienced such a winter before in Georgia. The weather has been very cold since the first of November. On Saturday 20th of this month, we had another "cold Saturday." Early Monday morning the thermometer was 8 degrees, and has not been higher than 20 degrees since. The mill pond has been in fine order for skating since Sunday morning and nearly all Jefferson has been on it. Wm. Thurmond tried the strength of the ice Sunday morning and received a cold bath to his sorrow, but the ice soon became too thick to treat the others in so discourteous a manner.

You have no doubt heard the story of "Handy Andy" and recollect his asking Dick Dawson whether he was an "uncle" or "aunt." I must inform you in the language of "Andy" that you are an "aunt" and that your niece, a week old tomorrow, is doing very well. You must excuse my nonsense.

(Signed) C. W. Long.

The life of a country doctor eighty years ago was one of continued hardship. In winter long cold rides through the country with mud to the hubs of the buggy wheels or when the roads became impassable for vehicles almost to the stirrups of the saddle, in summer exposure to the blazing radiance of the sun began to tell upon my father's health. From all indications he realized that he was doomed to become a victim of tuberculosis.

When either a medical student in Philadelphia, or in a hospital in New York (the location I have forgotten but not the cir-

cumstances), he dissected the lungs of a physician who had always maintained that many cases of what was then considered a fatal disease, tuberculosis, or consumption as it was commonly called, were curable, that he himself was an example of the truth of that belief, and at his death his lungs were to be examined. This was done and upon them my father, one of many, saw the scars of the tubercles that had healed years before. Recalling this he was undismayed and by employing practically the same treatment which is in vogue today, he was restored to health.

We now come to another eventful year in the young physician's life. I quote from a paper read by him at the meeting of the faculty of the Georgia Medical College in 1848.

The first notice I saw of the use of ether, or rather of Dr. Morton's "letheon" as an anaesthetic, was in the editorial of the *Medical Examiner* for December, 1846, in which the Editor gives the following extract from a paper by Dr. H. J. Bigelow contained in the *Boston Journal*. "The preparation is inhaled from a small two-necked glass globe, and smells of ether and is, we have little doubt, an ethereal solution of some narcotic substance."

Having on several occasions used ether, since March, 1842, to prevent pain in surgical operations, immediately after reading this notice of "Letheon" I commenced a communication to the *Medical Examiner* for publication in that Journal, to notify the medical profession that sulphuric ether, when inhaled, would of itself render surgical operations painless, and that it had been used by me for that purpose for more than four years. I was interrupted when I had written but a few lines, and was prevented by a very laborious country practice from resuming my communication until the *Medical Examiner* for January, 1847, was received, which reached me in a few days after reading the December number. It contained several articles giving accounts of different experiments in etherization, in which surgical operations were performed without pain. On reading this article I determined to wait for a few months before publishing an account of my discovery in order to learn whether any surgeon would present a

claim to having used ether in surgical operations prior to the time it was used by me, but as no account has been published, so far as I have been able to ascertain, of the inhalation of ether being used to prevent pain, in surgical operations as early as March, 1842, my friends think I would be doing myself injustice not to notify my brethren of the medical profession of my priority in the use of ether by inhalation in surgical operations.

The late Dr. R. J. Massey, who at that period was a student at the Georgia Medical College (now known as the Medical Department of the University of Georgia), gives some interesting facts concerning Long's visit there:

About this time, 1848, Dr. Paul F. Eve invited Dr. Long to Augusta, the object being to confer with him in order to prosecute his claims before the world as to his priority in the use of anaesthesia. Dr. Long was introduced to the class as the originator of practical anaesthesia.

The substance of Dr. Eve's remarks as I then took them down and afterwards incorporated them in my graduating thesis the next year are as follows: In order to fully understand the situation it is proper to say that Dr. Paul F. Eve was then the Nestor of southern surgery, and was recognized as an authority not only in America, but in Paris, then the center of medicine and surgery of the world. After having attended the best schools in America he had spent five years in Paris, graduating with distinction.

The first successful abdominal hysterectomy in America was performed by Dr. Eve in April, 1850. This was done for malignant disease. In April, 1854, Dr. Eve introduced in America the bilateral operation of lithotomy. His first paper appeared in the *American Journal of Medical Sciences* of the above date reporting four cases. He did more than any other American surgeon to give this operation a recognized status in this country.

For a number of years (1845-1849) Dr. Eve was editor of the *Southern Medical and Surgical Journal*, conducting it on a high plane and with marked ability. In Novem-

ber, 1850, he was called to the chair of surgery in the University of Louisville, and was afterwards professor of surgery in the University of Nashville.

Dr. Eve, tall, brusque, emphatic, one of the most forcible lecturers ever before the public in any capacity, said:

Young gentleman, this is the event of a lifetime. I introduce no distinguished individual. Our guest today comes unheralded. No great honors are heaped upon his head. He is a plain practical doctor. He comes, however, well equipped for the duties of his profession. He is learned, painstaking and very observant. His researches so far have already convinced the profession that a bright and useful life is before him. While quiet and diffident, he possesses all the requisites of success. He has already mastered a scientific solution that when properly learned will entirely revolutionize the field of surgery. I introduce to you Dr. Crawford W. Long of Jefferson whom posterity will honor as the very first man to apply practical anesthesia successfully to surgical operations. A Wells, a Morton or a Jackson, or a Sir James Y. Simpson, the world renowned Scotch obstetrician, may for the present wrest the honors from Dr. Long.

I will not live to see the time, but young gentlemen under the sound of my voice will see Dr. Long crowned as the greatest benefactor to suffering humanity. To him will be erected a monument of love and honor in grateful hearts, all over the world, more enduring than brass and lasting than marble, while with heartfelt emotion I greet our guest and congratulate you upon the honor of this acquaintance to a brother doctor to whom the future is bright indeed. I suspend the lecture for ten minutes for the class to shake the hand of such a public benefactor as Dr. Long has proven himself to be.

In 1849, Dr. Long published in the *Southern Medical and Surgical Journal* an account of his discovery with affidavits of witnesses.

For nearly three years the celebrated ether controversy between Wells, Jackson and Morton had been waging which led to so much jealousy, heart burnings and eventually tragedy and suicide. From all this my father held aloof, pursuing the even tenor of his way, ministering to the sick and in his spare hours reading specially on medical subjects. His skill in surgery was becoming known and he was frequently called in

consultation by neighboring practitioners, in particular by Dr. Richard Banks, one of the most noted physicians in the state, living at Gainesville forty miles distant. Dr. Banks was modest to a fault and left no record of his best work. It is known, however, that he was the first American surgeon to extirpate the parotid gland, in 1831. The parotid region was then a *terra incognita* in surgery and the possibility of removing the gland was a mooted question. Dr. Banks' fame as a surgeon seems to have proceeded largely from his operations for cataract and for stone in the bladder. In lithotomy he was the contemporary and compeer of the celebrated Dudley of Kentucky. Up to 1852 it is said that Dr. Banks had performed lithotomy sixty-four times with but two unsuccessful results. He was assisted by my father in a number of his operations. I have heard my mother speak of her pride in the fact that his skill was appreciated by so noted a physician as Dr. Banks.

My father began the administration of ether in his obstetrical work a few years after his discovery. According to the testimony of my mother he administered it to her at the birth of one of her children about 1847, which was probably his first use of ether in obstetrics.

From that time until his death in 1870 he used it at his discretion in all such cases.

As is well known his very last case was an obstetrical one. He literally died in harness, falling unconscious upon the patient's bed, shortly after her delivery; just previous to this he had suggested that ether be administered to her. There being no complications it was not done. The patient's husband, who was himself a physician, vouched for this.

The facts mentioned above prove beyond question the falsity of the statement made by some that not realizing the importance of his discovery he abandoned it.

There was a deeply rooted superstition not confined to the ignorant alone, that "child-bearing was the primeval curse.

The prospect to the world original sin from pain Providence.

to Dr. L. obstetrics arrested for pains of labor the crown of

"For the new ideas barred science past one suffering."

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The prospective mother was about to give to the world a new creature cursed with original sin, and to afford her surcease from pain was to thwart the designs of Providence." Three hundred years previous to Dr. Long's employment of ether in obstetrics a Hamburg physician had been arrested for his attempt to mitigate the pains of labor, convicted and sentenced by the crown to be burned.

"For thousands of years antagonism to new ideas choked independent thought, barred scientific progress, and made the past one long night of heartache and suffering."

As late even as in 1874 my father's desire to relieve the anguish of a young woman in childbirth was thwarted by her mother, a highly cultured and religious woman who felt that such would violate the scriptural injunction: "In pain and sorrow said who knew him, and many of these still living can bear witness."

To defy ignorance and superstition demanded an unusual degree of courage and indomitable will-power. These two qualities my father possessed, as everyone said who knew him, and many of these still living can bear witness.

If he had a specialty in his profession it must have been that of obstetrics. He was considered very skilful in maternity cases and was frequently called in consultation by physicians in and around Athens, to operate where the use of instruments or surgery was required. When he had entire charge in preparing the prospective mother for her time of trial he lost but two cases in his long practice of nearly forty years. A fine record when we remember this was before the day of antiseptic surgery.

He did not depend alone upon his medical skill. Many times when doubtful of the recovery of one of his patients he sought help from a higher source in earnest prayer. Said one who had been with him many times under such stress: "No one could be with Dr. Long under the pressure of anxiety in the sick chamber and not see prayer in the meditative stillness of his eyes. No man

could do such work as he did except God be with him."

THE FAMOUS ETHER CONTROVERSY

Hugh H. Young states:

In 1849, Morton petitioned Congress for a reward for his discovery. He was at once opposed by Jackson and the friends of Wells, who was dead. The celebrated ether controversy thus begun, occupied the attention of Congress for years, and was characterized by the greatest animosity between the former bosom friends and companions.

In April, 1853, my father read a paper before the State Medical Society at a meeting in Savannah, Georgia. The organization enthusiastically endorsed his claims, and advised that he should present them before the American Medical Association. A letter written to Dr. Paul F. Eve reveals his own feelings on this subject:

Athens, Ga. March 7th, 1854.

Dr. Paul F. Eve,
Nashville, Tenn.

Dear Doctor:

In accordance with the suggestion in your note, I have been corresponding with our members in Congress, and am informed there will soon be a bill introduced making an appropriation for the discovery, and leaving with the Secretary of Treasury to decide who is entitled to the compensation. Should the bill be passed, so as to make the appropriation to the discoverer be the first to apply it to surgical operations, I think I will be able to establish conclusively my claims to its first use.

In your note you remark that you think it will be too late to attend to the suggestion of the State Medical Society at the next meeting of the National Medical Association, and if presented it would be laid off for want of time. My object in addressing you at this time is to ask your opinion more fully on the propriety of presenting the subject before the National Association. I am free to say that I would much prefer my claim to the discovery being admitted by the National Medical Association to *any appropriation* which might be made by Congress. I am entitled to the credit of priority of discovery, and I am extremely anxious that this honor

should be yielded to me by enlightened members of the medical profession.

I believe now I have my proof in such condition as would satisfy the minds of the delegates to the National Medical Association.

Very truly yours,
C. W. Long.

Nashville, April 8th, 1854.

Dear Doctor:

I think it would be well if you can to get an expression from the American Medical Association. It meets in St. Louis and a steamer leaves here on the 27th of April, 4 P.M. to carry delegates there. I shall take pleasure to do all I can for you and beg you will come directly to my house on the 26th. of this month. I expect to be at the meeting—let me know and I will meet you at the Depot, the 26th . . .

I would advise you by all means to prosecute your claims to priority, and for one I say God speed you.

Your sincere friend,
Paul F. Eve.

Dr. Eve and my father were later informed "that no disputes could be examined into by that society." My father realized that the time had come when he must take part in the conflict, that in that way alone could he obtain recognition of his claims. He wrote to Judge Junius Hillyer, congressman from Georgia, stating his case and giving proofs. He also wrote to Senator Dawson. It seems Dawson was a friend of Jackson, for he wrote to him of this new claimant and requested him to investigate his case. This Jackson did, calling upon him March 8, 1854. An extract of a letter from Judge Andrews to a prominent physician then living in New York gives the details of the conversation between two of the claimants.

In March, 1854, early in the day, a stranger entered the drug store (to which I have referred) and inquired for Dr. C. W. Long. I told him Dr. Long was not in and invited him to a seat by the fire. In a few moments Dr. Long came and as he approached the fire, the stranger presented his card, introducing himself as Dr. Charles T. Jackson of Boston, Mass. Dr. Jackson was a spare-made angular man of

swarthy complexion; dark hair and eyes; apparently forty years of age. After a moment's conversation, Dr. Jackson said to Dr. Long: that he called to see him for the purpose of comparing notes as to the first discovery of the anaesthetic effects of Sulphuric Ether; they both and others claiming this discovery. Dr. Long pleasantly assented to conferring with him upon the subject, and I was called upon to witness their interview, and to examine with them the documentary evidence that each would submit.

Dr. Jackson stated "that his profession was that of an analytical chemist in Boston, Mass.: That a few doors from his office in Boston was the office of Dr. W. T. G. Morton, a dentist: That on September 30th, 1846, Dr. Morton came to his office and said, 'Dr. Jackson, I have to perform an operation upon a patient who is suffering very much, and is in a very nervous condition, can you suggest or give me something that will allay the pain and quiet the excessive nervousness?' That he took a small vial of Sulphuric Ether, adding some essential oils to disguise its odor, and cautioned him in its use, and fully directed him how to have the patient inhale it. Finally Dr. Morton and he (Jackson) made a contract respecting the use of the anaesthetic, and applied for a patent under the name of 'Letheon' and later in 1849, Morton petitioned for a reward, and that he and Dr. Horace Wells, a dentist of the State of Connecticut applied to the U. S. Congress also for this great reward. While a controversy was in progress before Congress, between Jackson, Morton and Wells, it became known that Dr. Crawford Long, of Athens, Georgia, had used ether as an anaesthetic in 1842, and that now he was here to compare notes as to the first discovery of ether as an anaesthetic."

Dr. Crawford Long then said "that his attention was first called to the condition by the actions of certain persons who were under the influence of Nitrous Oxide (Laughing Gas) Experiments in his own office, the subjects inhaling Sulphuric Ether, made him believe that surgical operations could be performed upon persons under the influence of Sulphuric Ether by inhalation, and without pain to the patient. He waited for an opportunity to use Sulphuric Ether in a surgical operation. The opportunity came, and on the 30th. March, 1842, he administered Sulphuric Ether by inhal-

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ation to James M. Venable of Jackson Co., Georgia, and extirpated a tumor from his neck and without pain to the patient."

Other operations followed this one and all in the presence of students and other citizens. During this time he conferred with physicians in all that section of Georgia, giving in detail his successful experiments and operations with Sulphuric Ether as an anaesthetic.

Drs. Jackson and Long submitted to my inspection much documentary evidence in the way of memoranda, book entries, certificates and affidavits made under oath by patients and lookers-on.

In their protracted conference they were frank but slow, careful, cautious and exact. It was a weary day's work, and vividly before me now, though so many years intervene.

Dr. Jackson went from Athens into the gold mining section of Georgia. As he had to pass through Jefferson where Dr. Long first used ether as an anaesthetic, he gave Dr. Jackson the names of physicians and citizens who saw and knew of his first frequent use of ether as an anaesthetic and who would personally give him their evidence.

On Dr. Jackson's return to Athens, after some ten days, he called upon Dr. Long again and in my presence. Throughout their conference during the two days that Dr. Jackson was in Athens to whatever proposition he made to Dr. Long for sharing with him the honor and benefits of this discovery, Dr. Long replied, "My claim to the discovery and use of sulphuric ether as an anaesthetic rests upon the facts of my use of it on the 30th. March, 1842, of which I have indisputable evidence under oath and from reputable citizens."

On taking leave of Dr. Long, late in the afternoon of the second day of his visit to Athens, Georgia, in March 1854, Dr. Jackson said to Dr. Long, "Well, Doctor, you have the advantage of us other claimants to the first discovery and use of sulphuric ether as an anaesthetic, but we have the advantage in having first published it to the world."

It is a thing of record published by Dr. Charles T. Jackson of Boston, Mass. in the "*Boston Medical and Surgical Journal*, on April 11th. 1861, that he (Jackson) visited Dr. C. W. Long at Athens, Ga. on March 8th. 1854, and that he then and there examined the evidence as to the claims of Dr. Long, as to the first discovery

and use of sulphuric ether as an anaesthetic in surgical operations. And from the evidence that was submitted, he learned that Dr. Long first used ether as an anaesthetic on 30th. March, 1842 in extirpating a tumor from the neck of James M. Venable of Jefferson, Jackson Co., Ga. without pain to the patient."

[Then comes a list of the first patients.] You will see that three of these operations were prior to the use in 1844, of Nitrous Oxide Gas as an anaesthetic by Dr. Horace Wells, a dentist of the State of Connecticut, and that all occurred prior to the suggestion on 30th. September, 1846, of the use of sulphuric ether to allay pain and the use of it on said September 30th. 1846, at Dr. C. T. Jackson's suggestion, by Dr. W. T. G. Morton, both of Boston, Mass.

When you know that writing at such length as this letter is, is wearying, you will pardon interlineations, and not ask that I shall tax my small modicum of strength as to attempt re-writing it.

I am as always,

Your friend,
C. H. Andrews.

Georgia Baldwin County,
Nov. 18th. 1900.

In another letter written by Judge Andrews he says: "After satisfying himself of the genuineness of the claims, Jackson proposed to Long to lay their claims conjointly before Congress—he, Jackson, to claim the discovery, and Long to claim the first practical use," his object evidently to get ahead of Morton.

This proposition was rejected by Dr. Long who was satisfied that he was entitled to both.

In a letter to Hon. D. L. Swain, ex-governor of North Carolina, which I have here, he says in regard to this transaction:

The only ground Dr. Jackson urged for his right to the discovery was that while suffering with pain and dyspnoea, in February, 1842, from breathing chlorine gas, he inhaled ether and found that while under its influence he was free from pain. He does not claim that he suggested its use to prevent pain in surgical operations until more than one year after my first operation was performed. I cannot give the exact date when I was first led to believe

that ether would prevent pain in surgical operations, but I know it was as early as February, 1842.

In 1839 Pereira, in his "Elements of Materia Medica," states: "The vapor of ether is inhaled to relieve the effects caused by accidental inhalation of chlorine gas. If the air be too strongly impregnated with ether, stupefaction ensues."

So there was very little new in Dr. Jackson's "discovery," and a mere untried inference hardly deserves the title of discovery.

Dr. Jackson finally acknowledged the justice of Dr. Long's claims and wrote to Senator Dawson to that effect.

On April 15, 1854, the appropriation bill was up before the Senate for its final reading. The friends of Wells and Morton, relying on the volumes of manuscript they had presented, were confidently awaiting the result, when Senator Dawson arose and said that he had a letter from Dr. Jackson which acknowledged that a Dr. Long in Georgia had undoubtedly used ether before any of the claimants for the appropriation.

Coming as it did from so prominent a contestant, this announcement fell like a thunderbolt on the rival claimants, and from that time they seem to have lost all hope of gaining the reward and passively allowed the bill to die.

Desirous only of preventing another from being recognized by Congress as the discoverer, and not wishing any pecuniary reward himself, Long never pushed the matter farther, and his documents of proof were never even brought up before Congress.

I have here an interesting memento of the conference between the two discoverers, in a card in which Jackson has written a note to Long. On one side it reads:

For Dr. C. W. Long,
of Athens, Ga.
C. T. Jackson,
New York Hotel.
(over)

and on the reverse:

Telegraph from J. L. Hayes, Washington.
"Assignee struck out by request of Mr. Everett."
Bill probably will come up in House July next.

Edward Everett was then senator from Massachusetts. In the transactions of the Senate, April 19, 1854, I find the following explanation of the bill by Senator Walker:

The bill as amended recites that a discovery of anaesthesia has been made—that it is believed the discovery was made by some one of the following persons, W. T. G. Morton, Chas. T. Jackson and Horace Wells, but it does not appear to the satisfaction of Congress which of those parties was the original, true and first discoverer thereof. It proposes to appropriate \$100,000.00 as a recompense for the real discoverer. In order to determine this it shall be the duty of the district attorney of the United States for the Northern District of New York, to file in the circuit court of the United States for that district a bill of interpleader wherein reciting the act or its substance, the Secretary of the Treasury shall be complainant, and W. T. G. Morton, Chas. T. Jackson and the personal representatives of Horace Wells or any other person who may make application to the court for that purpose shall be defendants. The issue is to be which of the parties named was the original, true and first discoverer of anaesthesia, and the court is to decide which one that is and direct the sum of \$100,000 be paid over to him.

At the instance of Senator Dawson, Dr. Long's name was also inserted in the bill.

I have carefully searched the Congressional Records and find that this bill never came up before the House for final passage, and consequently never reached the district court of New York. It seems to have been abandoned.

Several years later Dr. Jackson wrote an article¹ giving Long the credit for the first use of ether in surgery. I have here Dr. Long's copy of that journal. The

¹ Jackson, C. T. First practical use of ether in surgical operations, *Bost. Med. & Surg. J.*, Boston, April 11, 1861.

communication is so important that I will quote most of it:

Messrs. Editors: At the request of the Hon. Mr. Davison, U. S. Senator from Georgia, on March 8th, 1854, I called upon Dr. C. W. Long, of Athens, Georgia, while on my way to the Dahlonega gold mines, and examined Dr. Long's evidence, on which his claims to the first practical operations with ether in surgery were founded, and wrote, as requested, to Mr. Dawson, who was then in the U. S. Senate, all I learned on the subject. From the documents shown me by Dr. Long, it appears that he employed sulphuric ether as an anaesthetic agent:

1st, March 30th, 1842, when he extirpated a small glandular tumor from the neck of James M. Venable, a boy in Jefferson, Georgia, now dead.

2nd, July 3rd, 1842, in the amputation of the toe of a negro boy belonging to Mrs. Hempbill, of Jackson, Ga.

3rd, Sept. 9th, 1843, in extirpation of a tumor from the head of Mary Vincent, of Jackson, Ga.

4th, Jan. 8th, 1845, in the amputation of a finger of a negro boy belonging to Ralph Bailey, of Jackson, Ga.

Copies of the letters and depositions proving these operations with ether were all shown me by Dr. Long.

I then called on Profs. Joseph and John Le Conte, then of the University of Georgia, at Athens, and inquired if they knew Dr. Long, and what his character was for truth and veracity. They both assured me that they knew him well, and that no one who knew him in that town would doubt his word, and that he was an honorable man in all respects.

Subsequently, on revisiting Athens, Dr. Long showed me his folio journal, or account book, in which stand the following entries:

James Venable

March 30th, 1842, Ether and excising tumor,	\$2.00
May 13th, Sul. Ether,	.25
June 6th, Excising tumor,	2.00

On the upper half of the same page, several charges for ether sold to the teacher of the Jefferson Academy are recorded, which ether Dr. Long told me was used by the teacher in exhibiting its exhilarating effects, and he said the boys used it for the same purpose in the

academy. I observed that all these records bore the appearance of old and original entries in the book.

On asking Dr. Long why he did not write to me or make known what he had done, he said, when he saw my dates he perceived that I made the *discovery* before him, and he did not suppose that anything done after that would be considered of much importance, and that he was awakened to the idea of asserting his claims to the first practical use of ether in operations, by learning that such claims were set up by others for this merit, and consequently he wrote to the Georgia delegation at Washington, stating the facts which Senator Dawson had requested me to inquire into.

I have waited expecting Dr. Long to publish his statements and evidence in full, and therefore have not before published what I learned from him. He is a very modest, retiring man and not disposed to bring his claims before any but a medical or scientific tribunal.

Had he written to me in season I would have presented his claims to the Academy of Sciences of France, but he allowed his case to go by default, and the Academy knew no more of his claims to the practical use of ether in surgical operations than I did.

Charles T. Jackson, M.D.

Boston, April 3, 1861.

The list of operations as given by Dr. Jackson is not complete, as he has omitted the second operation on Venable, and a number of the later operations. In a letter to Dr. Sims, which I have, Dr. Long denies absolutely that he ever acknowledged that Dr. Jackson was the prior discoverer. He had been led to infer that ether had anaesthetic powers several months before he got a chance to verify it, and before Jackson claims to have made similar inferences, but he dated his claims of discovery from the time of his first practical demonstration. Before that it was a mere supposition, as was Jackson's also.

But barring these inaccuracies, Dr. Jackson's paper, coming as it does from one who so zealously coveted the title of discoverer, is a remarkable admission.

The interview between Long and Jackson must have been most amicable, and Long

evidently felt the greatest respect for Jackson, as shown in the following letter:

Athens, Ga., Nov. 15th. 1854.

Dr. C. T. Jackson.

Dear Sir: I design to prepare an article with the proofs of the priority of my claims of the discovery of the anaesthetic powers of ether and of its applicability to surgical operations. I design having this published in pamphlet for distribution among the members of the medical profession, and I expect to present such proof with the article as will satisfy all that I am entitled to all I claim.

Ours are rival claims, and permit me, sir, to say that although our claims are conflicting, I would not knowingly say anything in the article which would be displeasing to you. I entertain high respect for you as a gentleman and man of science and feel honored by your acquaintance.

Still it becomes each one of us to use all honorable means to advance his own claims, and I know you will not blame me for attending to this matter, which so much concerns my reputation.

Shall it meet with your approbation, I may refer to your admissions to Hon. W. C. Dawson, and myself, of the belief of the correctness of my claims. I will however, make no allusion to your letter to Mr. Dawson or to the conversation held with myself unless it meets with your sanction . . .

Your obedient servant,

C. W. Long.

It has often been stated by the friends of Morton that he never attempted to enforce his patent. The following letter from a prominent army surgeon to Long may be of interest.

U. S. Marine Hospital,
Chelsea, Mass.,
April, 1859.

Dr. Crawford W. Long, Athens, Ga.

Sir: Hon. Judge Hyllier, Solicitor of Treasury Department, informed me about a year since, and recently repeated the same, that some years since you used sulph. ether as an anaesthetic and had a record of the same. If it is not asking too much of you, I would be greatly obliged if at your earliest convenience you would forward me a statement of the facts.

I take the liberty to ask this of you because Mr. W. T. G. Morton, to whom in conjunction with Dr. C. T. Jackson a patent was granted in Nov., 1846, for using ether, has brought a suit against me as a government officer for an infringement of his patent.

Judge Hyllier was confident that you could furnish me with proof sufficient to satisfy a jury that you used it way before he or Jackson claimed to have made the discovery. I should have asked for these proofs through my attorney and had them properly witnessed, etc., but the Secretary of the Treasury having decided that I used the article on my own responsibility and therefore the Govt. were not bound to defend me, I wish to save as much expense as possible.

Very respectfully,

(Signed) Charles A. Davis, M.D.

Physician and Superintendent.

In reply Long gives a detailed account of his work, and then adds:

I presume Dr. Jackson is not party to the prosecution, as I know he entertains no good feelings towards W. T. G. Morton. If you think proper you can see him and ascertain the character of proof I can make. From the little acquaintance formed with him I entertain a high opinion of him as a gentleman and think he will do me justice notwithstanding he himself claims to have made the discovery and has received several awards.

Dr. Davis' letter was written twelve years after Morton's "Letheon" was patented, and many years after ether was the common property of the world.

From an exceedingly well-written paper by Dr. Hugh Young of Baltimore, who had access to all of the material relating to my father's discovery, read before the Johns Hopkins Historical Society, November 8, 1896, I quote the following:

Long's work was unknown to the world until 1877, when J. Marion Sims, learning of him through accident, investigated his claims, was fully convinced of their merit, and vigorously demanded their recognition by the medical profession. His paper appeared in the *Virginia Medical Monthly*, May, 1877.

This article, which obtained for Long the first recognition of any consequence, was the outcome of a conversation which Sims had with a Dr. P. A. Wilhite of Anderson, S. C. Wilhite told Sims that he had witnessed the first surgical operation ever done under ether, and recounted Dr. Long's first case, saying that he was one of the four students then in Dr. Long's office.

Wilhite did not enter Dr. Long's office until 1844, two years after the first operation, as the following letter from Long to Wilhite shows:

Athens, Ga. May 20th, 1877.

Dr. H. P. Wilhite,

Dear Sir:

I received Dr. Sims' article on anaesthesia yesterday, and find several mistakes. Dr. Sims states that yourself, Dr. Groves, Dr. J. D. and Dr. H. R. J. Long were students of mine, and witnessed the operation performed on Venable in 1842. Your recollection failed you at the time. As it was several years, at least two, before either entered my office, you will see that you were mistaken in giving this information. You also made a mistake in saying that the first inhalation in Jefferson of ether for its exhilarating effects was before the same persons. I wrote to Dr. Sims informing him of the errors, and asking him if he considered the mistakes of sufficient importance to be noticed.

(Signed) C. W. Long.

Dr. Wilhite replied as follows:

Anderson, S. C. June 27th, '77.

Dr. C. W. Long,

Dear Doctor: Yours of the 22nd. inst. is at hand, and I have just received a letter from Dr. J. M. Sims, which I will answer today. In my statement I did make a mistake in regard to my being present at the first or second operation, which mistake I will correct. But if you still prefer I will send a certificate.

Let me know and I will give you any information or assistance in this great matter.

Yours truly, etc.

P. H. Wilhite.

Among my father's papers is a certificate from Dr. Wilhite. Many affidavits were secured, not only from witnesses to operations performed upon anesthetized patients, but from some who had known and discussed the matter with the patients, or outsiders. This action was taken to prove that there was nothing hidden or mysterious and that the public knew the agent used to produce insensibility.

State of South Carolina, Anderson District.

I, Philip A. Wilhite, do state that in the month of October, 1844, I entered the office of Dr. C. W. Long of Jefferson, Jackson county, Georgia, where I continued some eighteen months. That very shortly after I entered his office and not later than the beginning of the year 1845, I heard the said C. W. Long speak of having used sulphuric ether by inhalation to prevent pain in surgical operations, he referring to a period of time before I entered his office, at which it had been used. Among other instances of which mention was made he had used sulphuric ether by inhalation, in cutting off tumors from the neck of James M. Venable, of which I heard Dr. Long and many others who had witnessed the operation frequently speak, and my impression is that I heard Venable himself speak of the operation as having been performed without feeling any pain. My recollection is distinct that the use of sulphuric ether by inhalation in such cases by said C. W. Long about the latter part of 1844 and early in 1845 was public and notorious about the town of Jefferson, from the mention so frequently made of it in my presence.

(Signed) P. H. Wilhite, M.D.

Sworn to and subscribed before me 4th February, 1854.

R. S. Vandiver, N.P.

This certificate is positive proof that Dr. Wilhite did not witness my father's first operations, neither did he encourage him to use ether to prevent pain in surgical operations, as he stated to Dr. Sims. Says Dr. Young: "It is to be regretted that the justification of Long's claims should have been linked so closely with such misstatements."

Sims sailed for Europe soon after the publication of his article, and Long died in a few months, and Wilhite's statements went unchallenged for many years, when in an article in the *Virginia Medical Monthly*, Dr. L. B. Grandy of Atlanta showed the error of Wilhite's statements.

From all parts of the world men prominent in the medical and other professions hastened to give him the credit which had been so long withheld. His claims were never investigated by the American Medical Asso-

ciation, as he often desired, but many minor societies and the Eclectic Medical Association passed decrees in his favor. But he was not long to enjoy the praise and honors that were bestowed upon him.

Jacobs states:

He bore a good and strong man's part in all the increasing burdens that fell upon the Southern people while rebuilding the destroyed fabric of that old civilization which was so full of charm and vibrant life. His wisdom and poise, his friendly advice and help were an example and constructive force in all movements for the good of his community. He did his full part in all civic endeavor, in his city, county, and State, that has resulted in the splendid position our Southland now, amid her restored conditions, holds in the progress of the world. Thus he continued to work until failing health, brought on by over-exertion in the performance of his duties, exhausted his powers. And it was consonant with unselfish devotion to duty, that the end of his labors should illustrate the trend of his whole life.

Although my father held himself aloof from the notorious ether controversy, in his spare moments he vigilantly safeguarded his own claims by procuring evidences from witnesses of operations which he had performed upon patients anesthetized by

the inhalation of sulphuric ether, also from many who, although not witnesses, knew of these cases from common report.

The first State Medical Society in Georgia had its origin in a meeting of physicians in Macon, March 20, 1849. The meeting was called by the Medical College of Georgia and the local societies of Savannah and Macon. About eighty delegates were present, among them my father, who became a charter member. At this meeting was discussed what action it would be wise for him to pursue to receive the credit for his discovery.

Dr. Paul F. Eve wrote to him as follows:

Augusta Ga., April 20, 1849.

Dear Sir:

I have read your communication with much interest. I certainly think your claim to the use of etherization in surgery as the first discoverer, a good one. Pray prosecute the matter. I shall take great pleasure in receiving any article on the subject for the Journal. Do this as early as you can and fortify the claim by the oath of the patients (if they can be procured) to the state of insensibility. I shall await a communication from you.

In great haste I am most respectfully,

Yours, etc.

Paul F. Eve.

To be concluded.





[From Crooke: A Description of the Body of Man. London, 1631.]

EDITORIALS

THE CENTENARY OF CHARCOT

Jean Charcot, the celebrated French neurologist, was born at Paris on November 29, 1825, and the profession is making preparations for the adequate celebration of his centenary. *L'Illustration* of May 30, 1925 has a most interesting article dealing chiefly with the intense interest which was excited in the lay mind by his researches on hypnotism in the last two decades of the nineteenth century, and regretting that this excitement and somewhat morbid interest has really tended to obscure the actual scientific results of his work.

Charcot became an interne at the Salpêtrière in 1853. The institution at that time was little more than a huge almshouse with a large proportion of its population suffering from various forms of mental disorders. After leaving the Salpêtrière for a very short time he returned to it as *chef de service* in 1862, and four years later established the course of clinical lectures which was to make his fame and bring students and teachers from all over the world to study under him. Having become professor of pathological anatomy in the Faculté de Médecine in 1872 he devoted special energy to developing the proper classification and teaching of diseases of the nervous system. As M. F. Honoré, the author of the article in *L'Illustration* remarks, until Charcot's day there was a lamentable ignorance of these diseases on the part of most physicians. The majority of physicians classed all diseases of the brain and spinal cord as "nervous" and made no attempt at discriminating diagnosis. Today the diagnostic symptoms and underlying pathology of such diseases are as clearly recognized as those which are found in diseases of the

heart and lungs and "this is the work of Charcot." He did much pioneer work in cerebral localization. Honoré points out that when Charcot used hypnotism as a means for the study of mental or psychopathic conditions, "he considered hypnotism as an experimental neurosis of which the study would at sometime throw light on a number of pathological, physiological or even psychological questions inaccessible otherwise."

Professor Giulain, clinical professor of nervous diseases in the Faculté de Médecine, in response to the question why Charcot, after having made so many real advances in the study of the organic lesions of the nervous system, seemed to abandon this solid ground for the dangerously unreal regions of hypnotism, stated his belief that Charcot thought that the study of the grand psychoses and hysteria was the best way in which to come to some comprehension of psychology. But, he adds that he thinks that in his researches Charcot was led astray by certain of his pupils as well as by the success which attended his demonstrations. He pictures Charcot at the apogee of his career, the most distinguished neurologist in the world, having in his audiences not only celebrated physicians but also lawyers and statesmen, surrounded by philosophers and psychologists constantly suggesting new experiments on the hysterical patients, and lastly the hysterical subjects themselves by reason of their own peculiar mentality desirous to make much of themselves in their somewhat theatrical surroundings, all tending to create an artificial atmosphere, not favorable to sound scientific results. Giulain points out that Charcot had the great merit of directing attention to many new phenomena such as

the distinction between hysterical and organic paralyses, and hystero-traumatism, and he did much to orient psychology to physiology.

Charcot had considerable artistic ability and *L'Illustration* reproduces several of his drawings from the collection which remains in the hands of his son. There are also some preserved at the Salpêtrière.

Aesculape, the French medico-historical journal, in its issue of May 5, 1925 has a most interesting article by Dr. Henry Meige on the pictures and statues of Charcot of which there are a larger number than is usually the case when a scientific man is the subject. Meige explains that this was not due to any vanity on Charcot's part but because he was an artist himself and was the intimate associate of many painters and sculptors, to whose art his noble countenance and bearing made him a particularly attractive subject. Charcot frequented many studios and took great pleasure in encouraging their occupants. His features lent themselves particularly well to the sculptor and Meige reproduces a number of busts and medals. He had a wide, powerful forehead, from which his hair was brushed back falling almost to his neck, a well-shaped Roman nose, fine and somewhat disdainful lips, a strong and somewhat prominent chin, and very deep orbits with thick eyebrows. His eyes were particularly expressive, their expression being at times very soft and at others imperious. The article is accompanied by several pictures of Charcot but Meige thinks that none of the paintings or engravings are equal to the portrayal of their subject in marble and bronze. The most generally known picture of Charcot is that by Brouillet entitled "A Lesson at the Salpêtrière" which represents him lecturing on a patient in his clinic.

Since Charcot's death in 1893 the value of his work has been more and more generally recognized as the distorted and sensational reports which were spread about it by the lay press have ceased to appear or to be read. In this lifetime many derided

him as a charlatan and a sensationalist, not realizing the new field that he was trying to open in the most obscure field of human pathology.

An interesting meeting in commemoration of Charcot was held at the Royal Society of Medicine on June 15, 1925. A collection of Charcot's writings and many portraits were shown, and specimens illustrating bone and joint lesions in tabes which had been brought to London by Charcot himself in 1881 for the meeting of the International Medical Congress. Dr. Farquhar Buzzard, President of the Section of Neurology of the Royal Society of Medicine, delivered an address on Charcot's work in which he stressed his importance as a pioneer and teacher. Speaking of his inspired gift of exposition, he stated that he probably would have been a great actor and stage-manager had he chosen to take up a dramatic career. He was curiously indifferent to the social position of his patients, replying once to the angry remonstrance of a princess whom he had kept waiting that she was evidently unaware of the fall of the Bastille. He was also very oblivious to the value of money. Charcot was most generous in appreciation of the work of others, the first to talk of Jacksonian epilepsy and recognize the work of Ferrier. Sir David Ferrier recalled his personal acquaintance with Charcot, which began in Charcot's clinic at the Salpêtrière, which he had converted from an old work-house infirmary, into the most popular clinic in Paris, if not in the world. He spoke of Charcot's demonstrations not only of hysteria, convulsions, etc. but also the forms of organic nervous diseases. He had extraordinary power over his patients and could make them do anything. Charcot spoke English well but was diffident about using it.

WHEN MR. PICKWICK WENT FISHING

Under the above title Dr. Samuel W. Lambert, of New York, has recently written a most delightful study of the much-mooted question as to whether Dickens was in-

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debted to the artist Robert Seymour for the idea of the *Pickwick Club*, and its famous annals. As so often happens to wanderers in literary by-paths Dr. Lambert's interest in the matter was aroused quite accidentally. In 1919 he purchased a small book entitled "Maxims and Hints for An Angler and Miseries of Fishing, to which are added Maxims and Hints for a Chess Player." The bookseller directed his attention to the pictures in the book as illustrating the influence of the "Pickwick Papers," even on such a remote subject as angling, and Dr. Lambert noted the resemblance to Mr. Pickwick of some of the anglers who were portrayed. When he came to examine the book more carefully he found to his great surprise that far from being an imitation of the "Pickwick Papers," it was rather the originator of some of the ideas contained in them, having been published in 1833, three years before the publication of the immortal work of Dickens. The illustrations were drawn by Robert Seymour. This led to a study of the original illustrated paper covers of the "Pickwick Papers." The twenty numbers of the original edition were all issued in paper covers designed by Robert Seymour, with the evident purpose of forecasting characters of the work. At the top is a sketch of someone, presumably Mr. Winkle, shooting at a bird. At the bottom there is a drawing of Mr. Pickwick asleep in a punt on the Thames. The boat is tied to a couple of posts and his neglected fishing rod is being bent by an unseen fish. The sides of the cover are decorated with fishing rods, nets, a gun and a bow and arrow. In short the cover design evidently indicates that the subject of sport is to be much to the fore in the Proceedings of the Club. This, however, is far from being the case as, with the exception of the feeble efforts of Mr. Winkle, there is no attempt at sport on the part of any of the members of the club.

Dr. Lambert has collected several other publications appearing before the *Pickwick Papers* in which there are pictures by Sey-

mour representing the figure which subsequently became famous under the name of Mr. Pickwick.

Starting with these premises Dr. Lambert tells the story of how Seymour had brought to Chapman and Hall, the publishers, a series of drawings to illustrate the annals of a club of cockney sportsmen. They cast about for a suitable author to write the text and had the good fortune to choose Charles Dickens. Seymour's design for the cover was retained and his illustrations used for the earlier numbers. The only time that Dickens and Seymour met was one evening in April, 1836, shortly after the tremendous success of the first number. There must have been an absolute divergence of views between the two men on the policy to be pursued in the writing of the subsequent numbers. Dickens could never have written sporting chronicles such as Seymour had drawn his pictures to illustrate. They had a sharp disagreement. Forty-eight hours later Seymour committed suicide.

Ever since the controversy has raged as to whether anyone besides Dickens had a hand in the development of his famous work.

Dr. Lambert's elucidation of the matter is most admirable and we think conclusive. His book is beautifully published with facsimiles of the Seymour cover and some of his illustrations. The writing of such a study must have been a labor of love and its reading will give delight to many. To even the most enthusiastic admirers of Dickens so fair and impartial a presentation cannot prove offensive and to the real student of his life and works it will be invaluable.

THE OATH OF HIPPOCRATES

Although scholars still dispute concerning the genuineness or falsity of many of the writings attributed to Hippocrates there is one invaluable work which is ascribed to him with practical unanimity, the Oath. Throughout the many centuries in which it has been held in such esteem by the medical world it has naturally undergone some

variations in the form in which it has been transcribed, but its essential virtues as a code of ethics have not been changed and it has undoubtedly served as a powerful contributing element to maintain the moral status of professional relations. W. H. S. Jones has recently published a most fascinating and erudite volume entitled "The Doctor's Oath"¹ in which he records the results of a collection of the most authoritative texts from manuscript sources contained in the libraries of Europe and England. Although the first distinct reference to the Oath as such is found in the works of Scribonius Largus, who wrote in the reign of the Emperor Claudian, Jones thinks that he has found an allusion to it in one of the comedies of Aristophanes, written about 400 B. C., and he believes that at least the "nucleus" of the Oath goes back to Hippocrates himself. There are many interesting problems. The clause in the Oath which requires the subscriber to it to show certain favors to his teachers and their families, and to reveal the secrets of the Art only to his own sons, or those of his teachers, or to certain outsiders who have been admitted to take the Oath, present, as Jones remarks, some of the essential elements of a guild or brotherhood. Possibly the strict terms of the Oath were intended to supplement the absence of any laws of the state which were especially and directly applicable to infringements of the rules which should govern professional conduct. Although Galen does not mention the Oath he does state that ancient physicians comprised "a clan of the Asclepiadæ, who taught their sons anatomy, who in turn transmitted their learning to the next generation. Many believe that the Oath was the pledge required of all who were admitted to membership in this "clan of the Asclepiadæ." Some of the other works of Hippocrates give us reason to think that this society was a secret one, a guild, and Jones inclines to this view though he doubts if it is capable

¹ Jones, W. H. S. *The Doctor's Oath*, Cambridge, 1924.

of proof. A great crux in the study of the Oath has always been the clause in which the subscriber is required to state that he will not operate for stone. We know that there were in ancient and down to quite modern times specialists in this operation who were not trained or recognized physicians or surgeons. As they usually were uneducated, often charlatans, possibly the regular profession felt it best to sever as far as possible all connection with such irregular practitioners. With Christianity it became necessary for the physician who was an adherent of the new faith to give up the Oath as sworn by pagan gods, and while keeping the substance change somewhat the form of the Oath. Jones gives the form of the Oath, "according to Hippocrates in so far as a Christian may swear it," collected from several medieval manuscripts. It will be noticed that the Christian Oath omits the clause against operations for stone. The comparison between the Pagan Oath and the Christian Oath is so interesting that we transcribe both from this interesting treatise. Jones also gives the text of the Oath as written in Arabian manuscripts, which we reproduce in connection with the others.

PAGAN OATH

Translation

I swear by Apollo Physician, by Asclepius, by Health, by Heal-all, and by all the gods and goddesses, making them witnesses, that I will carry out, according to my ability and judgment, this oath and this indenture.

To regard my teacher in this art as equal to my parents; to make him partner in my livelihood, and when he is in need of money to share mine with him; to consider his offspring equal to my brothers; to teach them this art, if they require to learn it, without fee or indenture; and to impart precept, oral instruction, and all the other learning, to my sons, to the sons of my teacher, and to pupils who have signed the indenture and sworn obedience to the physicians' Law, but to none other.

I will use treatment to help the sick according to my ability and judgment, but I will never use it to injure or wrong them.

I will not give poison to anyone though asked to do so, nor will I suggest such a plan. Similarly I will not give a pessary to a woman to cause abortion. But in purity and in holiness I will guard my life and my art.

I will not use the knife either on sufferers from stone, but I will give place to such as are craftsmen therein.

Into whatsoever houses I enter, I will do so to help the sick, keeping myself free from all intentional wrong-doing and harm, especially from fornication with woman or man, bond or free.

Whatsoever in the course of practice I see or hear (or even outside my practice in social intercourse) that ought never to be published abroad, I will not divulge, but consider such things to be holy secrets.

Now if I keep this oath and break it not, may I enjoy honour, in my life and art, among all men for all time; but if I transgress and forswear myself, may the opposite befall me.

FROM THE OATH ACCORDING TO HIPPOCRATES IN SO FAR AS A CHRISTIAN MAY SWEAR IT

Blessed be God the Father of our Lord Jesus Christ, who is blessed for ever and ever; I lie not.

I will bring no stain upon the learning of the medical art. Neither will I give poison to anybody though asked to do so, nor will I suggest such a plan. Similarly I will not give treatment to women to cause abortion, treatment neither from above nor from below. But I will teach this art, to those who require to learn it, without grudging and without an indenture. I will use treatment to help the sick according to my ability and judgment. And in purity and in holiness I will guard my art. Into whatsoever houses I enter, I will do so to help the sick, keeping myself free from all wrongdoing, intentional or unintentional, tending to death or to injury, and from fornication with bond or free, man or woman. Whatsoever in the course of practice I see or hear (or outside my practice in social intercourse) that ought not to be published abroad, I will not divulge, but consider such things to be holy secrets. Now if I keep this oath and break it not, may God be my helper in my life and art, and may I be honored among all men for all time. If I keep faith, well; but if I forswear myself may the opposite befall me.

THE TEXT OF THE COVENANT LAID DOWN BY HIPPOCRATES

Hippocrates said: I swear in the name of God, the Master of life and death, the Giver of health and Creator of healing and of every treatment, and I swear in the name of Aesculapius, and of all the holy ones of God, male and female, and I call them to witness, that I will fulfil this oath and these conditions. I will regard my teacher in this art as my father, I will share with him my means of livelihood, and I will make him my partner in my wealth, and I will give him my wealth whenever he may be in need of it.

As for his descendants, I regard them as my brothers, and I will teach them this art without any remuneration or condition, should they desire to learn it. And I associate together (i.e., regard as equal), in the injunctions and in the sciences and in all else contained in the art, my own children, the children of my teacher, and the disciples on whom the oath (or covenant) has been imposed, and who have sworn to observe the medical code of honour. And I will not do so for any other than these.

In all my treatment I will strive so far as lies in my power for the benefit of the patients. And I will restrain myself from things which are injurious to them, or are likely in my opinion to do them harm. And I will not give them any poisonous drug if they ask for it, nor will I advise them thus. Nor will I contemplate administering any pessary which may cause abortion. And in my treatment and in the practice of my art I will keep myself pure and holy. And I will not operate on those who have stone in the bladder; rather I will leave it for those whose profession it is. And I will enter every abode into which I may go only for the benefit of the sick, being in a state devoid of (all deliberate intention of) wrong-doing, injustice, mischief-making, such as might be intended in other transactions, or in respect of sexual relations with woman or man, whether free or slaves.

And as for the things which I may see or hear during the time of treating the sick, or at times other than those in which I am so engaged, about such behaviour of men as should not be talked of outside, I will keep silence, considering that such things should not be discussed.

He who fulfils this oath and does not violate any part of it, to him will it be granted to carry out his treatment and his art under the most

excellent and favourable conditions, and to be praised by all men in future for ever; while the contrary will be the portion of him who transgresses it.

We trust that all those interested in the history of medicine will read this most interesting treatise on one of its most important subjects.

THE FIFTH INTERNATIONAL CONGRESS ON THE HISTORY OF MEDICINE

The fifth Congress to be held on the history of medicine since the foundation of the Society in 1920 took place at the Athénée in Geneva, July 20 to 25, under the presidency of Dr. Charles Greene Cumston, formerly of Boston, and now Instructor in Medical History in the University of Geneva. Eleven nations were represented (Belgium, Denmark, France, Great Britain, Holland, Italy, Morocco, Poland, Spain, Switzerland and the United States) and although the number of those registered was not as great as at the previous Congress (influenced largely by the unfavorable rate of exchange), the percentage attending the various sessions was considerably higher. Five national sections (Egypt, Greece, Portugal, Roumania and Sweden) were not represented. Each session was presided over by the representative of one of the countries participating.

In opening the Congress Monday afternoon, Dr. Cumston gave an interesting talk on several men prominent in the medical history of Geneva. He pointed out that Daniel Le Clerc by the publication of his "Histoire de la Médecine" in 1696, antedating Freind by twenty-nine years, was justly entitled to be considered the father of the history of medicine. Sarasin, Bonetus, Tronchin, Rilliet and others were mentioned. Dr. André Patry, president of the Geneva Medical Society, described the prominent rôle that Swiss ophthalmologists had played in the development of their specialty. Other welcoming addresses were

made by M. André Oltramare, chief of the department of public instruction, representing the Conseil d'Etat of Switzerland and of the Canton of Geneva; by M. Georgas Werner, rector of the University of Geneva, and Dr. Hughes Oltramare, representing the City of Geneva. After an excellent apology for the study of the history of medicine by Tricot Royer, the president of the International Association, E. Pittard gave an interesting illustrated talk on prehistoric medicine and surgery. There were about eighty persons present.

A list of subjects treated and their authors can be founded in the program and the complete articles will later be available in the *Comptes Rendus* published by the Association. While the order here given was not strictly followed almost every paper was presented and many additional facts of interest were brought out in discussion. The communications in English seemed above the average, perhaps because they were better understood by your reporter, but also because they seemed more carefully prepared and kept within the allotted time of fifteen minutes without an enforced and hurried distortion of the latter part of the paper. De Peyer's communication possessed an added interest, in that it dealt with his own ancestor, the discoverer of the lymph patches in the small intestine that bear his name. De Lint's unpublished letter of Tronchin's was important in throwing a new and more pleasant light on the character of that well-known Genevese physician.

At the Wednesday sessions the outstanding contributions were: a scholarly presentation by Prof. Jeanselme of Paris on the Germanic conceptions of surgical anatomy at the time of the barbarian invasions, as shown by their laws governing compensations for injury; a philosophic discussion of Paracelsus' medical views by R. O. Moore; Mrs. Lindsay's description of the growth of dentistry in England; and Wickersheimer's minute description of Maitre Gispadeu of Annecy.

At the morning, Laënnec's more rapid other names Boston introduced ica. Dr. interesting of St. John the Middle itis and specimen convent. on I-Em was read details of later been were shared sacred v found in Museum Memphis argue the Fate No d the plea past, ha ful par evening by the pagne night. Mme. beautiful unsurp interes the cel childre lake il On W univer evenin Genev was d on a tunity in its Lunch

At the last scientific session on Friday morning, Prof. Wrzosek described how Laënnec's discovery of auscultation made more rapid headway in Poland than in other nations, and J. W. Courtney of Boston described Waterhouse's efforts to introduce Jenner's vaccination into America. Dr. Alcalde of Madrid gave a very interesting description of the iron crowns of St. John of Jerusalem, which were used in the Middle Ages to cure headaches, meningitis and so forth, and demonstrated a fine specimen that he had found in a Spanish convent. Dr. J. B. Hurry's communication on I-Em-Hetep, "he who procures peace," was read by C. J. S. Thompson. Many details of King Zoser's prime minister, who later became the medical god of Egypt, were shown to be well known through sacred writings and such statues as can be found in the Wellcome and the British Museums and his tomb and temple at Memphis. Altogether they form a strong argument in favor of his being considered the Father of Medicine.

No description of the Congress can omit the pleasant social features which, as in the past, have formed an important and delightful part of these meetings. On Monday evening the Congressists were entertained by the President with a concert and champagne supper which lasted until after midnight. After the Tuesday meeting, Dr. and Mme. Riillet gave a garden party at their beautiful property of Vengeron with its unsurpassed view of Mt. Blanc, and showed interesting souvenirs of their grandfather, the celebrated describer of typhoid fever in children. That evening the beautiful annual lake illumination with fireworks was given. On Wednesday the medical treasures of the university library were exhibited and in the evening a reception given by the City of Geneva at the Palais Eynard. Thursday was devoted to a tour of the lake of Geneva on a special boat, giving a splendid opportunity to see this beautiful body of water in its varied aspects of sunshine and storm. Lunch at the world-famous Castle of Chillon

with a tour of inspection was followed by a banquet at the new hotel at Evian with inspection of the Source Cachat. Geneva was reached by 8 p.m. The Congress banquet on Friday evening terminated a delightful evening.

The next Congress will be held at Leyden in July, 1927, under the presidency of Dr. J. G. de Lint. There is every reason to hope that by that time all of the important countries of Europe will have become members.

E. B. KRUMBHAAR, M.D.

SOME HISTORICAL CASES OF DISEASE AND THEIR REMOTE EFFECTS ON OTHERS

Under the above caption Sir Humphry Rolleston¹ has written a most entertaining article on some of the prominent persons whose relations with their fellowmen have been more or less affected by their physical condition. He refers to the many studies which have appeared in recent years in which post-mortem clinics have been held upon the mighty dead and to the interesting speculations to which they have given rise. Sir Humphry brings up one scientific aspect of such historic studies which is of such importance that it is to be regretted that more has not been done so far in its elucidation. He writes²:

There is again the interest of now discovering that individual cases of a condition, recorded for the first time in detail, were really examples of diseases or syndromes not recognized and established until many years later. It is perhaps not so generally known as it might be that this was done twenty-five years ago on a considerable scale by Sir (then Dr.) Archibald Garrod in the index he compiled to the first thirty volumes of the "Clinical Society of London" (1868-1897), thus providing, for example, references to cases subsequently recognizable as acromegaly, myxoedema, and urticaria pigmentosa. In 1908, just after the Royal Society of Medicine arose like a phoenix from the amalgamation of most of the existing Medical Societies

¹ Rolleston, Sir H. *Midland Med. J.*, Jan., 1925.

² *Op. Cit.* p. 5.

of London, a committee was set up to consider the same method of indexing and bringing up to date the titles of the numerous papers in the ninety volumes of the Royal Medical and Chirurgical Society, but this ambitious scheme was never carried into effect. Priority for description of a disease rather than priority for nomenclature may thus be established. A recent and rather interesting conclusion from our more extended experience since the war is that the condition formerly known as Dubini's electric chorea was really the myoclonic form of epidemic encephalitis.

Sir Humphry refers to the writing of Cabanés, Mac Larin and George M. Gould. The latter's contention that practically every great man in any walk of life was the victim of some uncorrected refractive error is almost counterbalanced by Berman's vociferous assertions as to the part which the endocrine glands played in their respective careers. Sir Humphry points to the fact that in very many instances there is absolutely no correspondence to be observed between the state of a man's health and his writings. Such a thoughtful and impartial survey of the literature of this subject is very valuable as writers with a theory to support such as Gould or Berman even though honest in intention are only too likely to misinterpret facts to support their contentions.

AN OLD ENGLISH VERSION OF AN OLD GERMAN TEXT

Our esteemed colleague, Dr. Charles Greene Cumston, lecturer on the History of Medicine and Medical Philosophy in the University of Geneva and president of the Fifth International Congress of the History of Medicine in 1925, has recently published

in the old German text accompanied by an English translation a book entitled "An Excellent Little Book in which will be found the means and methods for the prevention of renal stone or gravel, as well as the means for the relief of those suffering from this affection. Written for everybody's use by Dr. George Pictor of the Roman and Royal Institute of Einsisheim, Upper Rhine, with a table of the contents of this little book. Printed at Mulhusen, Upper Rhine, by John Schirenggrand and Peter Schmid." The book was written in 1557. Its author, George Pictor, was born at Villengen in the Black Forest in 1500. He taught school at Freiburg in Bresgau, where he also studied medicine. Later he was stipendiary physician at Einsisheim. Cumston gives a bibliography of his medical writings. The present work shows very little originality on the part of the author but is an interesting compendium of what were the generally received views of the time on the etiology, diagnosis and treatment of renal calculi. There is, of course, no mention of any surgical procedures. Even where the writer deals with cases in which he states a stone has descended into the bladder or urethra he makes no reference to lithotomy, although that operation dates back to remote antiquity and was in vogue in the Europe of his time. For a stone which has lodged far forward in the urethra Pictor recommends that the penis be plunged in hot oil containing numerous bedbugs, or that a bedbug be introduced into the urethra, as "it attracts the stone." The little book is most artistically printed and we congratulate Dr. Cumston and thank him for revivifying a very characteristic sixteenth century medical work.

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CORRESPONDENCE

To the Editor:

Dr. Percy M. Dawson's interpretation of Semmelweis, in the September, 1924, number of the *ANNALS OF MEDICAL HISTORY* is sufficiently interesting to stand the correction of a minor lapse. On page 272, through an obvious slip, Auenbrugger is spoken of as the "inventor of auscultation," and Skoda as the "inventor of percussion." It is, of course, trite to recall that Auenbrugger became known as the inventor of percussion through the publication of his "Inventum Novum" in 1761, the same year in which Morgagni's classic was published. It was not until 1808, however, that his invention was really made known to the world by Corvisart. The inventor of auscultation was, of course, Laënnec; the first edition of his immortal work, "Traité de l'auscultation médiate," appeared in 1819, shortly after his invention of the stethoscope. It was not until 1839 that Skoda published his "Abhandlung ueber Perkussion und Auscultation," which further amplified these two important branches of physical diagnosis.

While these facts are well known to medical students, the occasion of correcting the slip in Dr. Dawson's article seems a favorable opportunity for their repetition.

E. B. KRUMBHAAR, M.D.
Philadelphia, Pa.

To the Editor:

There is tucked away in the *American Journal of Ophthalmology*¹ a little article by Frederick H. Voerhoef and Jonas Friedenwald, a report on an injury to the cornea due to fish bile. There is a story about this article and a remarkable interest from the standpoint of medical history.

While studying at the Massachusetts Charitable Eye and Ear Infirmary, Dr.

Jonas Friedenwald treated a patient who had an eroded cornea and conjunctiva. The patient said that while opening a codfish the gall-bladder burst and the bile squirted in his eye. Some studies were made on the action of fish bile on the eye and on a visit to his father, Dr. Harry Friedenwald of Baltimore, the son told the father of the experience and that a search of the literature had not revealed a single case of a similar accident. But the father knew of a remarkable instance and so a reference to this early case was included in the report. Some two thousand years ago there was recorded, in the Apocryphal Book of Tobit, an experience where fish bile was used not accidentally but intentionally to remove corneal opacities. It is worth while to recall the exact words in this connection:

Tobit Chapter II.

9. The same night also I returned from the burial, and slept by the wall of my courtyard, being polluted, and my face was uncovered:

10. And I knew not that there were sparrows in the wall, and my eyes being open, the sparrows muted warm dung into mine eyes; and a whiteness came into mine eyes; and I went to the physicians, but they helped me not; moreover Achiacharus did nourish me, until I went to Elymais.

Chapter VI.

1. And as they went on their journey, they came in the evening to the river Tigris, and they lodged there.

2. And when the young man went down to wash himself, a fish leaped out of the river and would have devoured him.

3. Then the angel said unto him, take the fish. And the young man laid hold of the fish, and drew it to land.

4. To whom the angel said, Open the fish, and take the heart, the liver and the gall, and put them up safely. . . .

¹ Nov., 1922, xxxix, No. xi.

8. As for the gall it is good to anoint a man that hath whiteness in his eyes, and he shall be healed.

Chapter xi.

8. Therefore anoint thou his eyes with gall, and being pricked therewith, he shall rub, and the whiteness shall fall away and he shall see thee . . .

11. And he took hold of his father: and he strake of the gall on his father's eyes, saying, Be of good hope my father.

12. And when his eyes began to smart he rubbed them.

13. And the whiteness pilled away from the corner of his eyes: and when he saw his son he fell upon his neck.

JOHN RUHRÄH, M.D.
Baltimore, Md.





BOOK REVIEWS

THE LIFE OF SIR WILLIAM OSLER. By Harvey Cushing. 2 Vols., Oxford, The Clarendon Press, 1925.

The material for a biography may be based upon or drawn from many and various sources. There is the public record of the subject's achievements, such as the positions he held, the honors he received, and his especially notable deeds or expressions of opinion. The letters and journals and private papers of a man are invaluable to the biographer—more than his published writings, which are, of course, also most useful. Lastly, there are the expressions of his colleagues and friends and, we might add, his enemies, concerning him and his actions.

The biographer of Sir William Osler has had an unusual abundance of material from the above-mentioned sources to draw upon and he has made a notably judicious use of it in writing an adequate biography of the most notable Anglo-American physician of this time. Osler's career as a teacher was unique in the impression he made by the results he achieved in no less than four distinct medical centers, and the mere relation of that record would be of interest. His correspondence was world wide and he wrote thousands of letters, many of which have most fortunately been preserved. These letters are most characteristic of the writer. Few men could express more in a few lines than Osler, and it is because he only wrote what was essential that his letters though very brief are invaluable as indicating the state of his mind or what he was engaged in at the time they were written. Although he did not keep one of those formidable daily records or journals, extracts from which form the appalling bulk of so many biographies, he was in the habit of jotting down brief notes in his professional day book or in some of the books which were his daily companions and these notes are of much interest. Dr. Cushing could have been at no loss for information from his friends and colleagues. Few men have been held in the esteem that Osler was. While living he was the victim of many spontaneous demonstrations of the affection of his colleagues, such as dinners, subscription gifts, and so forth, culminating in the two

huge volumes of papers written by upwards of one hundred and fifty of his friends and former pupils which were published in honor of his seventieth birthday. After his death there were many memorial meetings, in Canada, the United States and England at which papers were read relating to various aspects of his career. Again, few men were on more intimate terms with Osler than was the author of this book, and in view of that fact we cannot refrain from noticing the notable modesty with which he has abstained from the mention of his own name throughout the book.

The life of William Osler divides itself into three distinct periods, the Canadian, from his birth in 1849 until his migration to the United States in 1884; his life in the United States from 1884 until he went to England in 1905, and the last years which he passed as Regius Professor of Medicine at Oxford.

His father, a hard working clergyman in a small Canadian town, spared no means to give him a good educational foundation, and Osler throughout his life loved to express his gratitude to two of his early teachers, William Arthur Johnston and James Bovell, by whom his interest in natural history which led to his studying medicine was stimulated and fostered. Gratitude to his early teachers was a prominent trait with Osler. He dedicated his "Textbook of Medicine" to Johnston and Bovell and R. Palmer Howard, his professor of medicine at McGill.

When at college Osler for a time thought seriously of entering the ministry but the intense interest aroused in him by his natural history studies led him, as stated above, to turn to medicine. The influence of his early work with the microscope was strong in him throughout his entire life and gave him that fortunate bent towards emphasizing the importance of clinical microscopy which was such a prominent feature in his teaching. After graduating at McGill he spent nearly two years abroad in study, chiefly in English laboratories of physiology and pathology. It is curious to find him inclined to try the practice of ophthalmology in Montreal,

chiefly because he thought that the practice of such a speciality would afford him more time to devote to laboratory work. Fortunately he decided that there was not a good opening for him, and very shortly after his return to Montreal he secured the appointment of Lecturer on the Institutes of Medicine at McGill, and sometime after that of Pathologist to the Montreal General Hospital, and in these two positions found just the right sphere to lay the foundations of his subsequent lifework. In 1875 he was made Professor of the Institutes of Medicine at McGill and was soon generally recognized as a new leader among the teachers of the profession. When nine years later he accepted the call to become Professor of Clinical Medicine in the University of Pennsylvania every possible effort was made to retain him at McGill, as it was realized what a tremendous loss he would be to that institution.

In Philadelphia Osler manifested the remarkable faculty, which he possessed in the highest degree, of making himself welcome and beloved in new and somewhat difficult surroundings. He also, as usual, stirred up things medical and introduced many new methods and ideas into the teaching at the oldest medical school in America. Heretofore there had been practically no teaching at the bedside and no attempt to teach clinical microscopy, two things which Osler immediately set about accomplishing. He also made use of the hitherto somewhat neglected material to be had in the deadhouse of Blockley, as the Philadelphia almshouse hospital was known in those days. There are in the archives of that deadhouse the longhand records in Osler's handwriting of no less than 162 autopsies which he performed there. Osler was appointed one of the visiting physicians to Blockley but as there were two regular pathologists and but few of the attending physicians ever performed any autopsies, his record of post mortems is a remarkable one. He became immensely popular with the students and the members of the Faculty at the University of Pennsylvania and when, in 1889, he accepted the chair of Professor of Medicine in the newly-established Johns Hopkins Medical School there was genuine regret at his loss in the medical community of Philadelphia.

In Baltimore Osler had the great opportunity of his life and he grasped it splendidly. With practically unlimited power over the establish-

ment of the medical teaching and hospital work in a new institution, unhampered by traditions, and with a rich endowment, Osler made the fullest and best use of the chance and achieved results such as had never been imagined before in this country. Gathering a group of able young men about him, firing them with his zeal, he threw himself into the work and in an amazingly short time the Johns Hopkins Medical School acquired the national eminence which it has maintained ever since. It is a great tribute to the judgment and wisdom of those in authority over the founding of the medical school that they should have made such excellent selections in their choice of the first professors, for in surgery, gynecology and pathology the pace set by the medical department was worthily emulated. Osler's faculty for making friends stood the new school in good stead. Baltimore was an old conservative city, with a highly respected medical profession, so that when it was learned that all the professors in the school which had been founded by a Baltimore man's money were to be called from outside of the ranks of the medical men of Baltimore there was deep and widespread indignation. Probably the personality of Osler had more to do with overcoming this resentment than any other factor. In 1892 Osler married the widow of Samuel W. Gross, and their house at No. 1 West Franklin Street became a center of hospitality whose irradiating influence did much to aid the work which Osler was steadily accomplishing by his universal geniality and genuine goodwill and above all by the modesty and self-effacement which went hand-in-hand with his scientific attainments. Throughout the pages of the Biography tribute, oftentimes unconsciously, is paid to the wonderful companionship of Lady Osler with her husband and the great assistance she was to him throughout their married life.

Another event marked the year 1892 in Osler's career, the appearance of the first edition of his famous "Textbook of Medicine," a work which by its originality, thoroughness and adaptation to the needs of the practitioner and student at once achieved a splendid success and still remains the most popular book of this character in the English language. Cushing gives an interesting letter written by a gentleman who was concerned with Mr. J. D. Rockefeller's beneficences relating how he, a layman, had read the new Textbook while on a vacation and

been so impressed that he had written a memorandum of some of its contents for Mr. Rockefeller directing his attention to the need for research institutions in this country, which ultimately resulted in the establishment of the Rockefeller Institute.

In connection with Osler's work in Baltimore, Cushing says: "The influence which, first and last, Osler exercised as a national and civic sanitary propagandist has been too little emphasized," a statement amply justified by the part which he took in urging sanitary reforms in Baltimore and in the formation of the national association to combat tuberculosis.

One of the most useful forms in which Osler's energy found a vent wherever he might be was in the organization of professional associations or in the rejuvenation of such as had become moribund, and especially such as bore on the literary or historical aspects of medicine. He was one of the founders of the Association of American Physicians and also one of the organizers of the First Triennial Congress of American Physicians and Surgeons and was active in founding several other national organizations. But it was in local organizations that his work was especially fruitful. Thus at McGill he had founded a Journal Club, and in Baltimore he founded a Book and Journal Club and the Johns Hopkins Historical Society, both of which proved invaluable adjuncts to the students and teachers.

One of the dominating interests of Osler's life was medical libraries. At McGill, to which he ultimately left his own library, he stimulated an interest in the library which has led to its becoming a most important collection. In Philadelphia he found a well-established library, that of the College of Physicians. He became a member of its Library Committee and took the most active interest in its affairs. In Baltimore he at once felt the lack of library facilities, the only medical library being a few hundred old books belonging to the Medical and Chirurgical Faculty of the State of Maryland, which were stored in the basement of the Maryland Historical Society. The Faculty bore the same titular relations to the profession in Baltimore as the College of Physicians did to the profession in Philadelphia. Osler at once became interested in the rejuvenation of the Faculty. He went on the Library committee and secured the appointment of a trained librarian. By his efforts the

whole aspect of things changed so that when he left Baltimore the Faculty was an active body with a well-furnished library of 15,000 volumes. He was a frequent user of the Library of the Surgeon-General in Washington and lost no opportunity to acknowledge his indebtedness to it. As Cushing says: "His interest in libraries was cumulative, and a contact once made was never subsequently lost." Even when he had taken up his abode at Oxford he continued to pick up books which he thought should be in the library of McGill, or the College of Physicians of Philadelphia, or the Medical and Chirurgical Faculty, and would send them where he deemed appropriate. The Association of Medical Libraries which was suggested by George M. Gould in 1898 owed its success most largely to Osler's fostering care.

Osler was no dry-as-dust bookman. Dr. Johnson would certainly have classed him as a "clubbable man." In every city in which he sojourned he became a member of social clubs and enjoyed them. He writes in his later years of the pleasure he derived from his membership in "The Club" which was the society of which the pages of Boswell contain such pleasant pictures.

One of the most astonishing features of Osler's career was the prodigality with which he met the constant demands for his already fully occupied time. His kindness not only led him to respond to every appeal but prompted him to go out of his way to perform kindly offices of all sorts, not only to those to whom he was bound in the golden circle of friendship but to others who merely trespassed on his good nature. Thus he responded to innumerable requests to read addresses or write articles, or contribute introductions to books. He became known wherever he dwelt as "the doctors' doctor" because wherever or whenever a doctor was sick, Osler was the consultant whom he and his friends desired to have for him. Many were the instances in which Osler hearing of the illness of a friend or former associate, perhaps in some far distant place, would steal away from his arduous work and hastening to the bedside would bring a ray of hope and consolation beyond the value even of his professional knowledge and experience. These self-sacrificing trips must have cost him much in time and money and energy.

An address by Osler was always a valuable feature of any gathering and he seemed always

able to meet the demand. Besides professional papers read before medical societies and addresses made to medical students or nurses, he was called upon to speak before lay audiences. Probably his best-known address to a lay audience was the most delightful Ingersoll Lecture on "Science and Immortality" which he delivered at Harvard in 1902. It is doubtful if anyone could have handled such a delicate topic with the same grace and skill.

In the summer of 1904 came the most momentous change in his life—the call to the chair of Regius Professor of Medicine at Oxford. The whole series of events is excellently described by Cushing. No greater tribute could have been paid him. As his predecessor, Sir John Burdon Sanderson, exclaimed when Osler's name was mentioned, he was "the very man." His long stay and the peculiar advantages of his position in Baltimore made the wrench a hard one. But he and Mrs. Osler both thought that the pace would be less strenuous and that it was absolutely essential that he should cease overworking. Little did they foresee the terrible strain he would be subjected to ten years later. A wail went up not only from Johns Hopkins and Baltimore but throughout the entire United States when it was announced that he had accepted the offer. It was when making his farewell address at Johns Hopkins on February 22, 1905 that he made the famous reference to the "fixed period" at which it might be well that men should be quietly put out of the way, an idea suggested by Anthony Trollope in a novel bearing that name. Most readers will remember the outburst of unpleasant newspaper notoriety which resulted from Osler's most innocent pleasantry. The unpleasant details are given in full by his biographer. It is pleasant to think that sensible people were able to appreciate the circumstances under which Osler spoke and to comprehend his meaning. We think it is a wise step to go into the details frankly and that hereafter there will possibly be as a result a further diminution in public interest in the matter.

On May 2, 1905 a memorable farewell dinner was given him in New York by over five hundred members of his profession, and on May 19, he sailed to enter upon the last phase of his noble career.

The second volume opens with a charming picture of the life of the Oslers in their new home.

Their surroundings were ideal and they soon adapted themselves to their environment. By virtue of his position as Regius Professor of Medicine Osler was also one of the Curators of the Bodleian Library and until the day of his death he took the most eager interest in its affairs. His duties at the medical school were very light. There were laboratories of physiology, anatomy and pathology but the students went to London for instruction in their fourth and fifth years. There were 150 beds in the Radcliffe Infirmary and Osler arranged to give clinical instruction to a small class of men. Osler became a Fellow of Christ Church and took great interest in its affairs, but his chief joy and interest at Oxford lay in the affairs of the Bodleian Library. Until the day of his death, he was devoted to its interests. Very shortly after his arrival in Oxford he was one of the most active participants in getting back for the Bodleian the copy of the First Folio Shakespeare which had once belonged to it but had been sold in the seventeenth century. Osler subscribed and got others to do so, to a fund to repurchase it and, when at the last moment it seemed as though the necessary sum could not be raised, he got it by a personal appeal to a rich Canadian friend. Burton, the author of the "Anatomy of Melancholy," had left a portion of his library to Christ Church, but the books had become scattered throughout the library. Osler gathered together about 500 of them, and had them placed on shelves surrounding a portrait of their former owner which he had copied from one which hung in Brasenose College.

At Oxford Osler was in a position to pick up historic rarities more frequently than was possible in Canada or America. It was wonderful how he would scent them out and the generosity with which he would give them to an appropriate recipient. Thus in 1911 he found a letter from Laënnec, written in 1810, in which "he refers to an unusual astronomical phenomenon observed in Baltimore which had been referred to him." This he promptly sends to the Medical and Chirurgical Faculty of Maryland. Again, he spies a set of early Harvard theses and lists of graduates in the Hunterian Museum at Glasgow, which he remembers are lacking from the library of Harvard. He has them photographed and sends them to be deposited there. He came into possession of Sir William Petty's manuscript

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letterbook in which was a sheet dealing with his Survey of Ireland. This Osler presented to the Library of Trinity College, Dublin.

Osler's services to the living were rivalled by his anxiety to keep green the memory of the dead. How many heroes of medicine Osler rescued from oblivion and by revealing the lessons taught by their lives and achievements stimulated his contemporaries to emulate them. Servetus, Elisha Bartlett, J. Y. Bassett, Beaumont and Daniel Drake were but names, even if as much, to most of the profession until Osler made their fame blossom in their dust. Although Charles Lamb had done much to arouse interest in Sir Thomas Browne and old Burton, it is to Osler that most of their present readers owe their taste for them.

The home of the Oslers in Oxford became famous for its hospitality. The hosts of friends they had made in their successive sojournings in Canada and America rarely visited England without dropping in at Oxford and never failed to receive a warm welcome at "The Open Arms." The Oslers loved young people and some of the most charming of Cushing's pages tell the stories of Osler's games which he carried on with some of his little friends.

At the coronation of King George V in 1911 Osler was made a baronet, an honor which sat very lightly on his shoulders and made absolutely no difference in his manner of living or attitude towards life in general. His chief delight was in the companionship of his son, Edward Revere Osler, who was born in 1896, and was growing into a fine youth. As he approached manhood he developed a distinct taste in a literary and bibliographic direction, and began the collection of a library. He was an enthusiastic fisherman and devoted to the works of Isaac Walton, which led to frequent references to him in his Father's letters as "Ike Walton."

In 1914 came the thunderbolt. The Oslers threw themselves heart and soul into war work. When the professors and their families who had been driven absolutely penniless from Louvain arrived in England, they were taken in by the teachers at Oxford and Lady Osler did everything possible towards providing them with food, clothing and employment. Huge hospitals were soon established in Oxford and its neighborhood and Sir William, now an honorary colonel in the British Army Medical Corps, became a chief consultant in the area. Enormous

contingents of Canadian troops were camped on Salisbury Plain and Osler took the deepest interest in their welfare. He was especially energetic in urging that every soldier should be vaccinated against smallpox and given anti-typhoid inoculation, and delivered many addresses to the men urging the importance of these measures. It would be impossible in a review to attempt any account of the innumerable and invaluable services which Osler rendered to the Canadian and later the American medical forces during the War. It is hard to realize their importance and extent.

The great tragedy which befell the Oslers when their boy was killed is vividly unfolded and as it was so typical of one of the most tragic features of the War it will have historic value in the future. When the War began Revere, a charming, healthy, normal lad, full of the joy of life and with delightful literary and artistic tastes, responded at once to the call. The agony of his father and mother is only revealed in glimpses as they concealed it with a noble reticence. Revere had absolutely none of the thirst for adventure or interest in the glamour of military life. Nevertheless he went into training and after some time spent as orderly and supply officer with the McGill Unit in France insisted on being transferred to the artillery. As early as November, 1915, Osler wrote that his friends "Schafer, Moore, Rolleston, Garrod, Hanford, Herringham and others have all lost boys" and from the outset he seems to have felt that the same fate was in store for him. He and Lady Osler had seen Oxford deserted by all the bright young men who had gone and they realized how few of them returned. After Revere left they only did more if possible to brighten the lives of others and there is but little to indicate what they suffered. In the midst of their private grief and laboring with all their might to aid their country their house "The Open Arms" was a haven to which resorted an innumerable throng of visitors who were always sure of a warm reception. No estimate can be made of the exact number of Canadian and American doctors who enjoyed the warm-hearted hospitality of the Oslers from 1914 to the close of the War. No sooner had a "Unit" arrived from some hospital in the United States than Osler heard of it and insisted on the officers coming down to visit him at Oxford. He seemed to have a faculty of finding

out even the unattached doctors who would be astonished at receiving a note bidding them come and see him. When on leave from France they trooped to Oxford. People in Canada or the United States would cable to him of a relative, sick or wounded, and they might be sure that Osler would spare no effort to be of service to the one in whom they were interested. If Osler laid the profession under his debt before the War he certainly multiplied the obligation out of all bounds during it.

In May 1920 the Classical Association under the presidency of Osler met at Oxford and he delivered one of his most splendid addresses with the title "The Old Humanities and the New Science." In conjunction with the meeting he had arranged with R. J. Gunther an exhibit of early scientific apparatus drawn forth from obscure corners of the Oxford colleges and printed a valuable catalogue of old physical, chemical, astronomical and other scientific instruments used by former Oxford scientists. Of his election to the distinguished position Professor Welsh well said: "It was in recognition not merely of his sympathetic interest in classical scholars, but also of his mastery of certain phases of the subject, especially the bibliographical and historical sides, and the relation of the work and thought of classical antiquity to the development of medicine, science and culture," and, after hearing his address he turned to Lady Osler and said "That was Osler at his very best."

Osler's seventieth and last birthday was made a great occasion by his multitude of friends and admirers in all the quarters of the globe. A splendid book in two large volumes composed of articles especially written for the work by some one hundred and fifty of his colleagues, former pupils and others was presented to him. For no man was such a gift more appropriate and by none could it have been more greatly appreciated. A number of the *Johns Hopkins Hospital Bulletin* containing a series of twenty articles dealing with various aspects of Osler's career and concluding with a bibliography of his writings compiled by the Librarian of the hospital, Miss M. W. Blogg, was another touching tribute.

Just after his birthday he had an attack of bronchial pneumonia which prostrated him severely. When he had recovered he and Lady Osler went to a quiet place in Jersey where they

spent six weeks during which Osler seemed to have recovered much of his old time health and spirits. In September Osler was called in consultation to Glasgow. On his return there was a railroad strike in progress and he had to motor from Newcastle to Oxford and when he finally reached his house he was again prostrated with a bronchopneumonia. The details of the protracted illness, which proved to be his last, are very fully given. He must have suffered greatly, as he had pleurisy, followed by empyema and abscess of the lung. He underwent several operations, and died after a severe hemorrhage on December 29, 1919. Through the last months of suffering he maintained his interest in everything and everybody, writing joking little notes, jotting down memoranda as to the disposition of books, reading his favorite authors, and cheering up those about him, although from the first he evidently knew what the outcome of his illness would be. The last pages of Cushing's book are heartrending but should be read by everyone who would realize how consistently Osler practiced his grand philosophy of life.

Dr. Cushing has written a splendid record of a noble life, a book that is worthy of him of whom it was written. He has given us Osler as he was. The reader is impressed throughout with the love and admiration of the author for his subject and he inspires his readers with the same feelings. The book should be placed in the hands of every young doctor or medical student. We know of no better stimulant to good work.

FRANCIS R. PACKARD. M.D.

OPUSCULA SELECTA NEERLANDICORUM IV. AULETIUS WALAEUS. DE GRAAF. DE FREMERY. VAN DEEN. Curatores Miscellaneorum quae vocantur Nederlandsch Tijdschrift Voor Geneeskunde Collegerunt et Ediderunt. Amstelodami, Sumptibus Societatis, 1922.

This is the fourth of a series of reproductions of medical classics, printed with Latin text on one page and Dutch translations on the opposite page, under the editorship of Pekelharing. The first volume was devoted to short classics by Erasmus, Leeuwenhoek, Swammerdam, Boerhaave, Gaubius and Donders, the second to Petrus Camper, and the third to Vesalius. For the present volume, several smaller works have again been chosen.

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The first, "Monitio de Reformanda Praxi Medica," a memorial by Alardus Auletius to the States of Friesland, was originally published in 1603. It has been translated into Dutch, for this edition, by A. Asscher of Groningen. To make modern readers feel at home, it might be mentioned that Auletius found quackery to be rife even then and that his first and greatest complaint was that many unqualified persons attempted to practice medicine, thus taking the bread out of the mouths of the regular physicians.

This is followed by two letters, both written in 1640, from the Leyden scientist, Johannes Walaëus (de Wale), to Bartholinus: "Epistolae Duæ de Motu Chyli et Sanguinis." This communication, in a form so common before the growth of medical journals permitted the dissemination of medical discoveries in the manner with which we are now familiar, was an important step in popularizing Harvey's great discovery among the scientists of the Continent.

The third item, "De Testibus Muliebris sive Ovariis," constitutes the twelfth and thirteenth chapters of Regnier de Graaf's book on the sex organs of woman, "De Mulierum Organis Generationi Inservientibus." This was of great importance in demonstrating not only that it was the ovary that was the female organ concerned with generation, but that mammals, like oviparous animals, also proceeded from eggs. Very good woodcuts of human and cow ovaries and of the genital apparatus of the rooster and hen are reproduced.

The treatise by Nicolaus Cornelius de Fremery on the changes in the female pelvis, especially those caused by softening of the bones, "De Mutationibus Figuræ Pelvis, præsertim illius, quæ ex Ossium Emollitione oriuntur," was written as an inaugural dissertation for the University of Leyden in 1793. Following a description of the normal pelvis and the conditions which determined its form, the author takes up the changes caused by rachitis, caries, scrofula and similar deforming processes. This contribution of 125 pages, the longest of the five, is finished with an appendix containing two long tables of pelvic measurements of various pathological specimens from the museum of A. Bonn, evidence which must still be valuable to the studious obstetrician of today.

Finally there is given, in Dutch only, "On the Anterior and Posterior Columns of the

Spinal Cord" ("Over de Voorste en Achterste Strengen van het Ruggemerg") by I. van Deen. This work, a reprint from the "Tijdschrift voor Natuurlijke Geschiedenis en Physiologie" (Vijfde Deel, 1838-1839), must be quite inaccessible to most medical students. For the scientific world at large it is perhaps unfortunate that the editor did not see fit to make it more accessible by conversely having it translated into Latin. It was an important contribution to the then infantile subject of experimental neurophysiology. Supplementing the work of Sir Charles Bell and Johannes Mueller, van Deen proved by experimental section and galvanization of the cord that the posterior tracts were concerned with sensation and the anterior tracts with motility. The lateral tracts of course were not properly labelled until a much later period.

Realizing that the *Opuscula* in the form in which they are presented will not be extensively studied outside of Holland and also for other obvious reasons, the reviewer has concerned himself chiefly with purveying information about their contents rather than attempting to pass judgment upon them. In the cause of preservation of rare documents, at least, it is good that the editor of this series promises future volumes of a similar nature.

E. B. KRUMBHAAR, M.D.

ANOTHER ONE-VOLUME HISTORY OF MEDICINE

HISTOIRE DE LA MÉDECINE. DEPUIS SES ORIGINES JUSQU'À NOS JOURS. Par le Dr. L. Meunier. Membre de la Société Française d'Histoire de la Médecine. Préface par le Professeur Gilbert Ballet, Président de la Société Française d'Histoire de la Médecine. Paris. Librairie E. Le François. 1924. Pp. vi + 642.

The history of any important institution, of any great people, written concisely in a single volume, must always be a "tour de force," a sort of literary "Kunststück." As Robert Louis Stevenson once said: "It is not hard to know what to write; the hard thing is to know what to leave out." If one is to write the history of a single race, or of a single civilization, that has clean-cut limitations and acknowledged boundaries, then it seems, at least, possible to achieve some sort of literary unity in a single volume. But to condense or to arrange the multitudi-

nous, widely scattered elements of the history of medicine, to give, within the pages of a single book, however bulky, a unified description and a grouping of facts that will disclose the general trend of development and illuminate it by the side lights thrown by important personal or racial events, this, indeed, is a task that might give pause to the boldest.

Yet the experiment has been tried, often enough.

Colonel Garrison's important volume, with its wealth of biographical detail and its valuable bibliographies, is a good example of the conscientious painstaking method of writing history; a monumental achievement of what the Germans call "*kolossale Fleissigkeit*."

Of another type is Steineg-Sudhoff's "*Geschichte der Medizin in Ueberblick mit Abbildungen*."¹ Here are no masses of footnotes, no chunks of small-typed sections that try both the eyes and the patience of the reader; but, instead of these, there are pictures, most delightful and fascinating pictures, that make the reading interesting and give the reader something that footnotes can never give: a sense of nearness, of personal contact with the lives and works of our dead colleagues.

Colonel Garrison is careful to call his book "An Introduction to the History of Medicine." Sudhoff reminds us that his book is only history "*im Ueberblick*."

Dr. Meunier's one-volume "History of Medicine" is a most interesting contrast to the German Sudhoff and the American Garrison. Dr. Meunier writes very pleasant French. Indeed, one is often compelled to admit that our French medical colleagues are seldom guilty of writing in "medical language," while so many American physicians feel no hesitation in committing mayhem on the King's English, as if a "hundred-per-cent American" had no obligations to anything belonging to a king. Dr. Meunier's book may be read with ease and pleasure. Indeed, I feel that it is some sort of a tribute to the book to admit that I actually read it from cover to cover.

It has no footnotes, like Garrison's; it has no pictures, like Sudhoff's. It is guilty of some serious omissions; it has some very drearily dull pages. But, on the whole, it is a proof that it is possible to write a one-volume history of medicine, shorn of all adventitious adornments of

¹ Jena, 1922.

notes or plates, that will still be both interesting and instructive, because the writer knows how to write his own language.

The one-volume historiographer, especially when writing the history of medicine, is constantly passing between Scylla and Charybdis. He must avoid the dull enumeration of facts, anatomical, pharmacological, clinical; and he must not devote too much space to the more interesting details in the lives of our "Fathers of Old." Dr. Meunier has not always succeeded in this. At times, he has barged into the Scylla of dreary enumeration and description. He seems to have a weakness for neurology; and his description of the achievements of the nineteenth century neurologists (pp. 538-546), with his affectionate tale of the Neurones, is deadly dull, at least to the ordinary non-neurologically inclined reader. He has also a weakness for enumerating drugs and plants and pharmacological preparations. Some pages remind one of the drug-store verses of Keats' "St. Agnes' Eve." On the other hand, he usually avoids the Charybdis of overloaded biographies. He has the true historian's ability of taking some small incident in the life of a great man, or else some unusual citation from his works, and of giving it a setting that arrests the reader's attention at once, and that leaves him with a bit of new information, a little new light, a something, told about a great man, that he remembers with pleasure, so that he turns back in the book, in order to read one particular page again. This is an experience that one seldom enjoys in reading histories of medicine. And it is the best test that I know of a history well written.

In his biography of Baglivi (p. 267), one of the most fascinating personalities in medical history, Meunier quotes the first sentence of his "*Pratique Medicale*"²:

"Ministre de la nature et son interprète, quoiqu'il veuille faire ou quoiqu'il fasse, le médecin doit se rappeler que le seul moyen de commander à la nature, c'est de savoir soi-même lui obéir."

Most of us have not the time to read through long articles on Baglivi, like those of Max Solomon, in the "*Zeitschrift für Klinische Medizin*,"³ but a short sentence like the one that I have quoted gives us, at once, Baglivi's mental attitude. One's interest is stimulated.

² Translated into French by J. Boucher, Paris, 1851.

³ xv, 279 ff.

One makes a mental note, to read something of his, when one gets time. And, perhaps, one does get time and does read, thanks to Dr. Meunier.

Again, in his description of legal medicine in the eighteenth century, Meunier gives us a single sentence (p. 389) from Mâhon (1752-1801), that every physician, connected with court work, ought to write over his door:

"In testimoniis ferendis ante omnia observandum ne medicus iudicium suum extra limites extendat, sed rationem decidendi relinquat jurisconsultis."

Dr. Meunier's book, however, has three grave omissions. And one cannot help feeling that it is his anti-Teutonic subconscious reactions which are to blame.

In his review of legal medicine of the present day, he makes no mention of the most famous of all criminologists and authorities on legal medicine, Professor Hans Gross of the University of Graz, to whom, twenty years ago, every man who was interested in the problems of legal medicine turned for teaching and advice. His "*Handbuch für Untersuchungsrichter als System der Kriminalistik*"⁴ is a classic, has been frequently translated, and is a remarkable achievement.

Much more serious is the omission of all mention of Ignaz Phillip Semmelweis, and of his gallant, heart-breaking struggle against puerperal infection. Semmelweis is one of the great heroes of medical history.

Most strange of all is the omission of Paul Ehrlich. In all Meunier's long discussions on syphilis, there is no reference to Ehrlich or to salvarsan. Ehrlich's name is mentioned, in very brief fashion, in connection with immunity (p. 519). But of his other achievements, there is not a single word.

These last two are serious blemishes in a work that is otherwise fair and well balanced.

On the whole, however, Dr. Meunier has not done badly in his attempt to write a one-volume history of medicine.

JOHN R. OLIVER, M.D.

MEDICINE, AN HISTORICAL OUTLINE. By M. G. Seelig, M.D., Professor of Clinical Surgery in the Washington University School of Medicine. Williams and Wilkins Company, Baltimore, 1925.

This volume is based on a series of eight lectures on the history of medicine delivered to

⁴München, 1922, 2 vols.

the students of the Washington University School of Medicine. The author modestly disclaims any attempt at writing an original work on the subject and states that his only object has been to give such a résumé as might stimulate further interest on the part of the reader. Dr. Seelig speaks truly when he states that too often the medical student is repelled by the large amount of material offered for his consumption in the standard medical histories, and that the modern medical curriculum is too crowded to furnish him the opportunity for its real study during his undergraduate life. Seelig therefore in his lectures has contented himself with a bird's-eye view of medical history from primitive times to the present day. Although as he states he has drawn freely from published standard works, such as Garrison, Baas and Pagel, and the standard biographies of prominent medical men, he shows that he himself has a most profound knowledge of the whole range of medical history and he presents his matter in a most original and charming way. This is nowhere more striking than in that portion of the book which deals with medieval medicine. This brief but excellent account of the early surgical writers, Henri de Mondeville, Gui de Chauliac and John of Arderne is typical of the verve with which he inspires what would otherwise be a dry catalogue of names. The scholarly quotations and references to works dealing with history and the sciences not strictly medical exhibit his wide reading and research. It is always possible in a review of a book such as this to point out places where one thinks the subject might have been more fully dealt with and others where the reviewer would have deemed it wise with such limited space to have been more brief. But such instances are matters for individual judgment and on the whole Dr. Seelig's book is as well balanced as one could desire. It is not just to compare it with Osler's "*Evolution of Medicine*" as the object and plan of the book are entirely different. We think Seelig has performed a most useful service to such medical students or even graduates as may have the good fortune to have this charming little book fall into their possession. It will stimulate their interest and serve as a guide to further reading.

The book has a most delightful preface, written in his best vein, by Fielding H. Garrison. Although not in complete accord with some

of the author's judgments he generously accords him the praise which is his due.

FRANCIS R. PACKARD, M.D.

A HIPPOCRATIC SCHOLAR

MALARIA AND GREEK HISTORY. By W. H. S. Jones, Manchester, 1909.

HIPPOCRATES. With an English translation, by W. H. S. Jones, The Loeb Classical Library, 2 vols., London, 1923.

THE DOCTORS' OATH, AN ESSAY IN THE HISTORY OF MEDICINE. By W. H. S. Jones, M.A., Cambridge, The University Press, 1924.

In February, 1925, the University of Cambridge conferred upon Mr. W. H. S. Jones the degree of Litt. D., which is, I take it, equivalent to our academic degree of PH.D.

Mr. Jones is one of those interesting, many-sided personalities that we find, unfortunately, so seldom in America, where even personalities are standardized. I know nothing about his early life. But, thanks to his many kind and courteous letters, which have been of infinite help to me in my own Hippocratic studies, I do know that his three publications, listed above, represent the labor of nearly twenty years. When I first began to write to him for advice he was, and he still is, "Bursar and Steward of St. Catherine's College, Cambridge." Years ago, when I was in England and had the good fortune to be able to spend a month at Trinity College, Cambridge, living in one of the undergraduate's rooms which looked out on the great quadrangle, I was entertained often at dinner in the rooms of a man who has since become very famous as a historian. He used to invite various dons and lecturers to meet me and among them, I remember very well, a distinguished cleric, who was introduced to me as "Figgis of Cats." I learned afterwards, that he was the Rev. Daniel Figgis; and that he was a Fellow of St. Catherine's College. But to me he has always remained "Figgis of Cats." I do not know whether or not Dr. Jones is addressed as "Jones of Cats."

At any rate, I do know that St. Catherine's College was founded in 1473 (in comparison even Harvard seems like a babe in arms), by one Robert Wodelarke, who was chancellor of the University and Provost of King's College. Why he founded it, I have no idea. The "Students' Handbook to the University of Cambridge" informs me that the Society

of the College, "at present consists of a Master, eight Fellows, and about twenty Scholars; Junior members in residence, 190." The Master is a "Right Reverend," a "Lord Bishop," and "ex-officio Canon of the Cathedral Church of Norwich." How a bishop gets to be a canon, in some other Bishop's Church, and why he is thus "ex-officio" is one of the many mysteries connected with English university life. At any rate, Mr. (or, as he now is, Dr.) Jones is lecturer in classics, and also bursar and steward.

It is the "bursar and steward" that fascinates my imagination. What does an eminent classical scholar do when he is bursar and steward? Here lies another mystery.

But that is what Dr. Jones is.

Whatever his duties may be, one feels assured that he cannot have very much free time on his hands. And yet, during this free time, he has done work in the field of Hippocratic research that is distinctly original, and that deserves the highest praise.

As I have already said, this type of mind is rare in America. For here is a very busy man, who is not a physician, and who is not a PH.D., that is, who has not devoted himself, as to a profession, to research or teaching in the field of classical philology, a man whose time is fully occupied with his round of daily duties, and who yet finds opportunity, during twenty years, to make himself the most important authority on Hippocrates in England today. Can one imagine the bursar or treasurer of an American college devoting his leisure hours to the study, let us say, of Aretaeus or of Dioscorides?

More interesting still is the fact that, until last February, when the University honored him with a degree, his long years of work had won him no marks of distinction or approval. Nevertheless, he worked quietly on. Not because he wanted either "distinction or approval," but because he loved the work that he was doing. And that is a characteristic, indeed the one distinctive characteristic of the true scholar.

Dr. Jones is, unfortunately, laboring under at least one misapprehension. And this misapprehension has arisen in connection with America. In a letter of October 2, 1924 (which he will, I hope, forgive me for quoting), he wrote, after speaking about his own work and its attendant discouragements: "I think that you value such studies in U. S. A. more than we do here."

How heartily one wishes that this were true! In order to understand what Dr. Jones has accomplished, one must know, in detail, what he has published.

The first little book on "Malaria in Greece" looks unpretentious enough. But it represents an enormous amount of patient labor, in getting together all references or allusions to malarial symptoms in the Greek authors. Dr. Jones is very guarded in his conclusions. He is never dogmatic at any time: that is one reason why his work is so valuable. But, after reading the little book on malaria, one's entire outlook on the history of the decline of Hellenic civilization becomes broadened; much that seemed hopelessly puzzling becomes clear; one begins to understand, at least partially, the underlying reasons for the gradual deterioration of Greek life, for the mysterious change from military hardened manhood to passive non-resistance and political pettiness. One sees the malarial infection rising like an overwhelming tide, until all that was best and most beautiful and most strong, went down before it. Jones' thesis, in this book, has been attacked. But, in my own reading, I have come across passage after passage, in Greek authors not quoted by Jones, which bear out his ideas.

His most important work, without doubt, was the publication in 1923 of his two volumes of Hippocrates, in the Loeb Classical Library. It is, I know, rather the habit among classical philologists of the first water to look down on the Loeb Library, because its volumes have the Greek or Latin text on one side of the page and an English translation on the other. This, they think, makes it too easy for the student. The only true way to the Greek authors is through the Teuber texts and Lidell and Scott's Greek dictionary, plus the lectures and seminars of the professors themselves. To get at the Greek, merely by looking across the page at an English translation, is not entering the sheepfold by the door. It is "climbing up some other way." My own point of view has always been that the important thing is to get into the sheepfold. How you got there, makes really little difference.

It may be true that many of the volumes of the Loeb Library present Greek texts that are not models of scholarly accuracy. True, too, that some of the translations, especially some of the metrical modern translations of the

dramatists, are so commonplace as to be almost amusing. This, I wish to point out, is not the case in the two volumes of Hippocrates that Dr. Jones has contributed to the Loeb Classical Library. He has edited his text with the greatest care. He has collated all the important manuscripts, either by consulting the codices themselves, or by means of photographs. And nowadays a good photograph, white or black on carbon paper, is as satisfactory as the manuscript itself, sometimes even better, for the photograph may bring out erasures and faded corrections that the eye often overlooks. No one, who has not himself tried to edit critically a single book of Hippocrates, comparing all the manuscripts, setting down all the variants, and then attempting to establish a satisfactory text, no one who has not attempted such a task can understand the amount of patient labor that has gone to the editing of the fifteen Hippocratic books contained in Dr. Jones' two Loeb volumes. Whatever emendations in the text he proposes are neither arbitrary nor without adequate authority. I speak from some small measure of knowledge. For I have collated his text of the *Book on the Sacred Disease* (vol. II, pp. 139-183) with the oldest codex containing this book (Vindobonensis IV., med. 4), and I have realized with what almost painful accuracy he has worked.

There is, in America, only one authority on the Hippocratic text who can be compared with Dr. Jones. And that is Professor Heidel of the Wesleyan University. He published a series of suggested emendations of the Hippocratic text in the *Harvard Studies in Classical Philology* for 1910. But his interest was in no sense a medical one. He was interested solely in the philosophy and the philosophic concepts and expressions that he found in the Hippocratic Corpus. For an all-round knowledge of Hippocrates he cannot be compared with Dr. Jones.

Better than the text, better than the English translation even, are the introductory essays contained in Dr. Jones' two volumes. To each of the fifteen books, there is a separate little introduction, which sums up our knowledge and our theories of the book in exact careful manner. And, in each of the two volumes, the Greek text is preceded by a whole group of introductory essays: a "General Introduction" (Vol. I) on Hippocrates and the Hippocratic writings and tradition, on the manuscripts, on the various

editions, on "The Humeral Pathology," on "Ancient Nursing," on "Ancient Medical Etiquette." To the average reader, who wants to know something about Hippocratic medicine, these little essays are invaluable.

In editing these two volumes for the Loeb Library, Dr. Jones had to keep in mind the fact that he was trying to present Hippocrates not to the minds of scholars who know Greek, but to the mind of the average reader, who had once known a little Greek and forgotten it, or who had, perhaps, never known any Greek at all. He was faced by a difficult task. To maintain a level of sound scholarship and yet never to become pedantic or overloaded by philological detail, to be scholarly and yet to be interesting, is not an easy thing.

In his last book, "The Doctors' Oath," Dr. Jones was free to treat his problem in a purely scholarly way. Here he is writing for classical philologists. And he has produced a very sound piece of work. At the same time, it is surprisingly interesting. Any physician might read it with interest and understanding. Especially delightful are the hitherto unknown forms of the Hippocratic Oath, so altered and rearranged "that a Christian might take it."

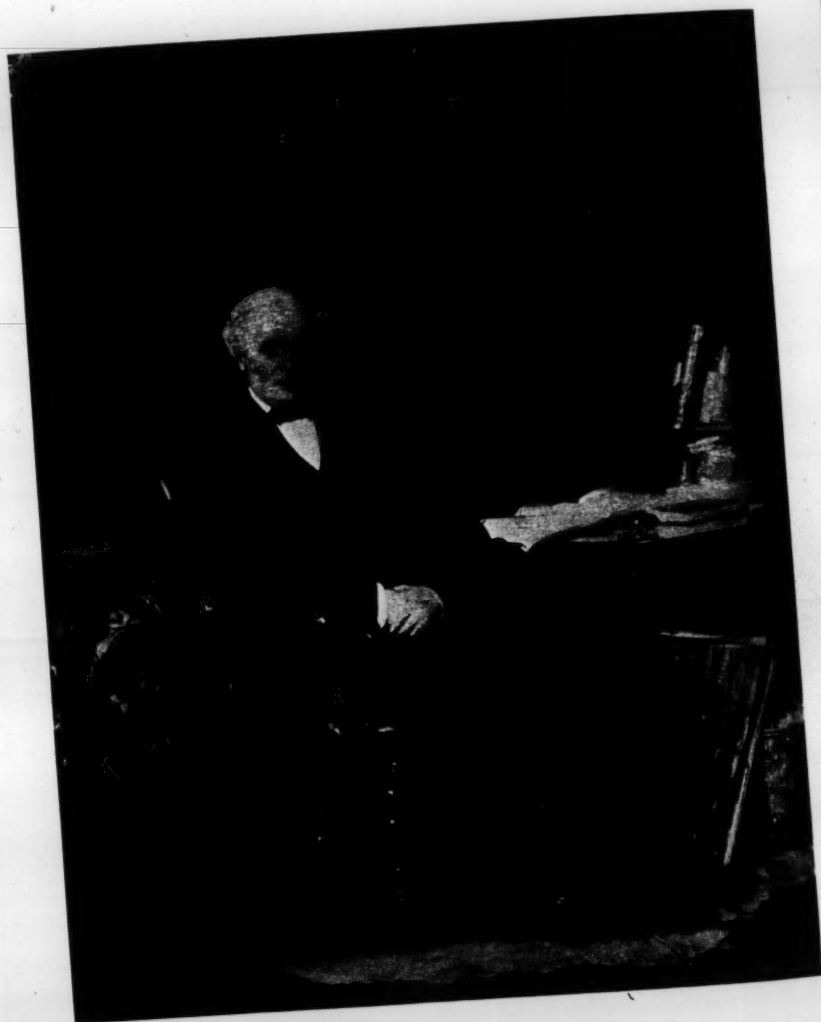
When one looks backward over the work that Dr. Jones has done in the Hippocratic field during the past twenty years, one is filled with admiration for the quiet, unobtrusive manner, for the persevering patience, for the painful accuracy with which the work has been accomplished. It is a lesson for us medical men. For here is a man, not a physician, a very busy active man, surely as busy as most physicians, who has yet found time to enter our field, the field of Greek medicine, and to do there work that ought to have been done by us. For any satisfactory comparison one has to go back to the sixteenth century, to the days of the good Anuce Foës of Metz, who was not only a practicing physician, not only the local "town doctor," but who spent his leisure time in working on Hippocrates, and whose monumental folio edition, appearing in 1595, has been ever since one of the great monuments of industry and erudition along the road of scholarship. Littré, on the other hand, was a scholar and nothing else. But Foës was one of ourselves.

I hope that this brief review of Dr. Jones' work may strengthen him in his belief that we, in the U. S. A., value and appreciate the fruits of his labors.

JOHN R. OLIVER, M.D.



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SIR DOMINIC CORRIGAN [1802-1880]
(Courtesy of the Royal College of Physicians, Dublin)



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